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The Economic and Behavioural Factors Affecting Corporate Dividend Policy: Theory and Evidence

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The Economic and Behavioural Factors Affecting Corporate Dividend Policy: Theory and Evidence

Abdullah Mohammed Al-Ghazali

A thesis submitted for the degree of Doctor of Philosophy

University of Bath

School of Management

November 2014

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This thesis is dedicated to my wife, daughter and son for their love and continuing support

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Abstract

This focuses on corporate dividend policy. The first empirical chapter analyses the information content of dividend announcements and factors that drive dividend changes in Oman, as a unique environment, for the period 2000-2011. Our work complements, and contrasts with, an existing study (Al-Yahyaee et al., 2011), which demonstrates a positive correlation between dividends and *stock prices* in Oman, in support of the signalling theory. Employing multiple methods from earlier studies, we demonstrate that there is some relationship between dividends and future *profitability*. However, after controlling for the nonlinearity in the profitability process, we find no evidence for the signalling theory of dividends. Furthermore, our analysis affirms the importance of past and current profitability in influencing the magnitude and the propensity to change (increase or decrease) dividends in Omani firms. Moreover, the results provide no evidence of the life cycle theory as an important factor that influences dividend changes in the emerging market of Oman.

The second chapter examines the relationship between managerial overconfidence, dividends and firm value by developing theoretical models that examine the conditions under which managerial overconfidence, dividends and firm value may be positive or negative. Furthermore, the models incorporate *moral hazard*, in terms of managerial effort shirking, and the potential for the manager to choose *negative NPV projects*, due to private benefits. Our models demonstrate that overconfidence can lead to higher dividends (when the manager is overconfident about his current ability) or lower dividends (when the manager is overconfident about his future ability). Furthermore, our results demonstrate that managerial bounded rationality could impact this relation.

The final chapter empirically examines the effect of managerial overconfidence on UK firms' payout policy for the period 2000 to 2012. The analysis incorporates, in addition to common firm-specific factors, a wide range of corporate governance factors and managerial characteristics that have been documented to affect the relationship between overconfidence and payout policy. Our results are robust to several estimation considerations. The findings show that the influence of overconfident CEOs on the amount of and the propensity to pay dividends is significant within the UK context. Specifically, we detect that there is a reduction in dividend payments in firms managed by overconfident managers compared to the non-overconfident counterparts. Moreover, we affirm that cash flows, firm size and profitability are positively correlated, while leverage, firm growth and investment are negatively correlated with the amount of and propensity to pay dividends. Interestingly, we demonstrate that firms with the potential for undervaluation reduce dividend payments. Some of the corporate governance factors are shown to motivate firms to pay

more dividends, while these factors seem to have no influence on the propensity to pay dividends. The results also show that in general higher overconfidence leads to more share repurchases but lower total payouts. Overall, managerial overconfidence should be considered as an important factor influencing payout policy in addition to other known factors.

List of Abbreviations

α	Manager's stake in firm's equity
ADRs	American Depository Receipts
B	Private benefits
C	Cost of effort
CEO	Chief executive officer
CFO	Chief financial officer
CS	Cross sectional regression
D_L	Low dividends announcement
D_M	Medium dividends announcement
D_H	High dividends announcement
DIVCH	Change in cash dividends
e_1	Manager's effort on project 1
e_2	Manager's effort on project 2
e_1^*	Manager's optimal effort in project 1
e_2^*	Manager's optimal effort in project 2
EBITDA	Earnings before interest, tax, depreciation and amortization
ECHG	Change in earnings
EDBV	Change in earnings divided by book value
EDMV	Change in earnings divided by market value
EPS	earnings per share
Eq.	Equation
FTSE	Financial Times Stock Exchange
I	The amount of investment
Lev	Firms' leverage
MB	Market-to-book ratio
MSM	Muscat Security Market
MV	Market value
NPV	Net Present Value

OLS	Ordinary least squares
p_1	The success probability of project 1
p_2	The success probability of project 2
PROFCHG	Change in firms profitability
R_H	High income
R_L	Low income
RE	Retained earnings
RETACHG	Change in retained earnings
ROA	Return on Assets
ROE	Return on equity
ROECHG	Change in return on equity
TA	Total assets
UK	United Kingdom
US	United States
\bar{V}_0	Market value of a firm
$V(D_L)$	Market value of a firm from announcing low dividends
$V(D_M)$	Market value of a firm from announcing medium dividends
$V(D_H)$	Market value of a firm from announcing high dividends
$V_{0,M1}$	Market value of a firm from model 1
$V_{0,M2}$	Market value of a firm from model 2
X	The expected cash flow from project 2
YLD	Dividend yield
$\hat{\Pi}_M$	Manager expected payoff
$\hat{\Pi}_M^L$	Manager expected payoff from announcing low dividends
$\hat{\Pi}_M^M$	Manager expected payoff from announcing medium dividends
$\hat{\Pi}_M^H$	Manager expected payoff from announcing high dividends
$\hat{\Pi}_{M1}^M$	Manager expected payoff from model 1

$\hat{\Pi}_{M2}^M$	Manager expected payoff from model 2
γ_1	Rational manager ability in project 1
$\hat{\gamma}_1$	Overconfident manager ability in project 1
γ_2	Rational manager ability in project 2
$\hat{\gamma}_2$	Overconfident manager ability in project 2

Chapter 1: Introduction

Corporations pay dividends to their shareholders. This payment depends on their financial situation and development needs. Firms make decisions about whether to pay dividends or not. If firms decide to pay dividends, the method, the amount, and the form of dividends is also decided. Since Miller and Modigliani's (1961) seminal dividend irrelevance theorem, corporate dividend policy has continued to puzzle financial economists for over 50 years. In the real world, researchers observe that many firms pay dividends, while others do not. This phenomenon encourages scholars to find explanations for the question of why firms pay and change dividends, as well as the effect of dividends on firms' value. A complete understanding of corporate dividend policy has not been achieved yet in spite of the extensive research in this area (e.g., Brav et al., 2005).

The signalling theory of dividends has been proposed in traditional corporate finance, which employs the standard assumption of fully rational, self-interested and utility maximising agents, attempting to explain firms' dividend policy. This theory argues that companies use dividends to convey information about their future prospect to the markets (Bhattacharya, 1979; John and Williams, 1985; Miller and Rock, 1985). That is, in the presence of asymmetric information between agents and shareholders, managers use dividends as a communication device. The empirical studies on this theory tend to focus on the market reaction to dividend announcements, and on the relationship between dividends and earnings. Although researchers find some support for the effects of dividend announcements on stock prices in both developed and developing markets (e.g., Aharony and Swary, 1980; Dasilas and Leventis, 2011), results on the association between dividend changes and earnings are inconclusive (Aggarwal *et al.*, 2012).

For example, Grullon *et al.* (2005) affirm that dividend changes do not convey any information about future earnings changes, which is inconsistent with the earlier study of Nissim and Ziv (2001), and argue that the opposite pattern revealed in the previous work is due to the assumption of linearity in the earnings process. Aggarwal *et al.* (2012) introduce another argument to the inconsistent findings on the relationship between dividends changes and future earnings. According to their argument, the mixed results are attributed to the variation of asymmetric information across public firms. They argue that the signalling theory of dividends is more likely to be supported among firms that have high level of asymmetric information. Black (1976) argues that the higher tax on dividends compared to capital gains make dividends effective as a signalling device.

The characteristics of the Omani market offer an opportunity to re-examine the signalling theory of dividends. In Oman there is no tax on dividends and capital gains. This would enable us to test

the tax based signalling theory (Black, 1976). Further, Omani firms change their dividend levels more frequently, rely heavily on bank financing and have high ownership concentration. These characteristics suggest that dividend changes should not be informative about future earnings changes. However, other market characteristics such as low corporate disclosure requirements, low transparency, unpublished earnings forecast and few professional analysts encourage managers to use dividend announcement to signal future profitability.

In a recent development, behavioural corporate finance examines the effects of managerial psychological biases on corporate finance decision-making (investment appraisal, capital structure, and dividend policy). A particular bias that has been analysed is that of managerial overconfidence. Much of the work has focussed on the effect of this managerial bias on investment appraisal and capital structure (e.g., Heaton, 2002; Malmendier and Tate, 2005a; Malmendier and Tate, 2005b; Doukas and Petmezas, 2007; Liu and Taffler, 2008; Malmendier and Tate, 2008; Croci *et al.*, 2010; Campbell *et al.*, 2011; Malmendier *et al.*, 2011). However, the research on managerial overconfidence and dividends is recently emerging, and is little understood (Wu and Liu, 2008; Cordeiro, 2009; Deshmukh *et al.*, 2013).

For example, Wu and Liu's (2008) theoretical model demonstrates that overconfident managers are more likely to pay high dividends due to their biases in their assessment of future earnings. In contrast, Deshmukh *et al.* (2013) develop a model which shows that, because overconfident CEOs overestimate the value of future projects and view external finance as costly, they are more likely to pay less dividends. However, none of these studies have theoretically considered the influence of agency problems on this relationship. Moreover, empirical studies on the impact of managerial overconfidence on corporate dividend policy have been conducted in the US, for the period from 1980-1994 and have not controlled for corporate governance factors and CEOs characteristics (Cordeiro, 2009; Deshmukh *et al.*, 2013). Cordeiro (2009) finds that the presence of overconfident CEOs is negatively associated with the likelihood of paying dividends, but not with the amount of dividends. In contrast, Deshmukh *et al.* (2013) show that managerial overconfidence reduce the amount of dividends.

The objective of this thesis is to study corporate dividend policy in both standard and behavioural corporate finance settings, and aims to provide further explanations as to *why firms change their dividend policy*. In a standard corporate finance setting, this project examines the information content of dividends, *dividend signalling*, in an emerging market where the institutional environment differs significantly from those in developed markets (i.e., Chapter 3). Moreover, the thesis attempts to answer the question of *why dividend policy varies across firms* from a behavioural corporate finance prospective. Specifically, Chapter 4 develops a theoretical model to

demonstrate the impact of a particular managerial cognitive bias, *overconfidence*, on dividend policy and firm value. The final chapter in this thesis, Chapter 5, aims to empirically investigate *the impact of managerial overconfidence on corporate dividend policy* in the UK.

Our first contribution from Chapter 3 is that we find evidence on the tax-based signalling model (Black, 1976), which suggests that dividends have to be taxed at higher rate to convey information about future earnings. This result is in line with the recent work of Kuo (2013) who detects a positive association between taxable stock dividends and future profitability. Moreover, the sample of Omani firms enables us to test the information content of dividends in a poor information environment. The results provide a further contribution to the existing literature in this area (e.g., Aggarwal et al., 2012). We show that the signalling theory of dividends does not hold among firms that exhibit a high level of asymmetric information, which contradicts the findings of Aggarwal et al. (2012) in the US. The final contribution of this chapter is that we provide an explanation for the high tendency of Omani firms to change their dividend levels. We report that the significant correlation between current earnings and dividends explains this phenomenon. Thus, investors should not anticipate dividend changes as a signal of future earnings changes (consistent with Grullon et al., 2005).

The second issue in this thesis in Chapter 4, theoretically examines the relationship between managerial overconfidence, dividend policy and firm value. This paper provides additional explanations to the contradictory evidence in the recent studies (Wu and Liu, 2008; Deshmukh et al., 2013). It shows that managerial overconfidence might lead to an increase or a decrease in corporate dividend policy. An increase happens when the manager is overconfident about his current ability to affect the success of current project: Model 1. However, when the manager is overconfident about his future ability to effect the success of a future project, an overconfident CEO pays less dividends: Model 2. We further show that managerial bounded rationality could affect this relation.

Chapter 5 provides several contributions to the existing literature on behavioural corporate finance. First, this study is the first paper that empirically investigates the influence of managerial overconfidence on payout policy in the UK. Our findings show that the effect of overconfident CEOs on the level of, and the likelihood to pay dividends is persistent outside the US (in line with Deshmukh *et al.*, 2013). The second contribution is related to the relationship between undervaluation and dividend policy. We demonstrate that undervalued firms pay less and are more likely to reduce dividends. This suggests that undervaluation should be considered as a factor in determining dividend policy. Third, we show that overconfident managers in undervalued firms reduce dividends less compared to rational peers; this stands in a sharp contrast to the earlier

studies that argue that overconfident CEOs pay less dividends because they usually believe their stocks are undervalued (e.g., Malmendier and Tate, 2005a; Hackbarth, 2008). Fourth, overconfident CEOs in firms with high institutional holdings and ownership concentration distribute more dividends compared to their rational peers.

The rest of the thesis is organised as follows. Chapter 2 reviews the theoretical and empirical literature related to dividend policy. In general, this chapter starts with a discussion of corporate financial policy in a standard corporate finance framework with particular focus on dividend policy. Furthermore, the chapter surveys the literature on the relationship between managerial compensation and corporate financial decisions. The chapter also reviews the relevant literature in behavioural finance before moving to behavioural corporate finance.

In a standard corporate finance setting, Chapter 3 empirically examines the information content of dividends, and the factors that affect dividend policy in an emerging market: Oman. It starts first with a brief discussion of the relevant literature. The hypotheses are developed based on prior literature and the institutional setting of the Omani market. The subsequent section describes the data and the sample selection. This is followed by two main empirical examinations; the relationship between dividend changes and earnings; and factors effecting dividend changes.

Chapter 4 develops theoretical models in a behavioural corporate finance setting. These models examine the relationship between managerial overconfidence and dividend policy. It begins with an overview of the model, and subsequently presents different models on the effect of overconfidence on dividend policy when managers are overconfident about current ability (Model 1) and overconfident about future ability (Model 2). Furthermore, the impact of managerial bounded rationality on the relationship between overconfidence and dividend policy is stated in the final section of this chapter. Numerical examples for each model are also presented.

Chapter 5 analyses the effect of managerial overconfidence on corporate dividend and payout policy. The relevant theoretical and empirical studies are discussed. Then this chapter develops hypotheses that are drawn from the previous section. The data and the methods used to test the hypotheses are stated. Next the results of the estimated methods are presented. Finally, a discussion of the findings is reported. Chapter 6 concludes the thesis, and draws conclusions from the empirical analyses and theoretical models. It also considers the limitations of the projects and discusses avenues for future academic research arising from the thesis.

Chapter 2: Literature Review

This thesis focuses on the economic and behavioural factors affecting corporate dividend policy, employing both theoretical and empirical approaches. In order to give the analysis some context, this chapter reviews the theoretical and empirical literature relating to corporate financial policy generally, before placing a particular focus on dividend policy. First, an overview of the corporate finance literature in a standard corporate finance framework (i.e. under the assumptions that market participants (managers and investors) are fully rational, self-interested, maximisers of expected utility) is presented. This section provides a brief literature review of corporate investment and financing decisions before focusing on corporate dividend policy. Moreover, the chapter discusses managerial compensation packages and their relevance to corporate financial decisions. The last section, behavioural corporate finance, begins with an overview of individual psychological biases before introducing the emerging research on the impact of managerial overconfidence on investment, financing and dividend policy decisions.

2.1 Standard corporate financial decisions

Traditional corporate finance focuses on firms' investment, financing and payout decisions under the assumptions of fully rational, self-interested and utility maximising agents. This section surveys the literature on corporate financial policy in a standard framework. It starts with a brief summary of corporate investment decisions before moving to capital structure decisions. Dividend policy, the focus of this study, will be reviewed in more detail.

2.1.1 Corporate investment decisions

The corporate investment decision is one of the most important decisions that firms make in order to maximise shareholders' value. It involves an investment made by a firm with the aim to receive, in return, future cash flows. This decision is crucial to ensure the future success of a firm in practice (e.g., Holmes, 1998). A firm is more likely to be liquidated or under financial distress if it makes bad investment decisions (e.g., Keasey and Watson, 1989). In general, firms should take all value maximising projects. Investment appraisal techniques are used to evaluate new projects and assist firms in deciding which investments to take. The net present value (NPV) technique is widely used in practice to evaluate new projects. Graham and Harvey (2001) note that over 70% of CFOs in their sample use NPV techniques to evaluate new projects. The principle of NPV is to discount

the future cash outflows and inflows, and sum them together. A firm should accept (reject) all projects if the NPV is positive (negative).¹

2.1.2 Corporate financing decisions

Corporate financing decisions have attracted scholars' attention since the seminal work of Modigliani and Miller (1958), who provided the bedrock of modern corporate financing theories. Their work argues that in an efficient market with no taxes, asymmetric information, transaction costs and bankruptcy costs, a firm's value is independent of its financing decisions. However, the irrelevance proposition of Modigliani and Miller has been questioned in the corporate finance literature with regards to its validity in an inefficient market or under the relaxation of some of its assumptions. Specifically, studies focus on whether firm's value is affected by corporate financing choices in a less efficient market or in the presence of asymmetric information or agency problems. This prompted the development of several theories of corporate financing decisions such as the trade-off, pecking order, market timing and agency theory.

2.1.2.1 Trade-off theory

The trade-off theory was developed by relaxing Modigliani and Miller's assumption on the absence of tax and bankruptcy costs. It argues that a firm could maximise its value by choosing an optimal debt/equity ratio. This could be accomplished through weighting the benefits and costs of taking additional debt when a firm seeks external financing (e.g., Myers and Majluf, 1984). More specifically, the optimality of debt-to-equity ratio is more likely to be determined by the trade-off between the advantages of interest tax shields (Scott, 1976) and costs of bankruptcy or financial distress associated with debt (Miller, 1977).

This theory provides an explanation for industry differences in capital structure choice and justifies the moderate debt-to-equity ratios observed in reality. Graham and Harvey (2001) survey more than 300 CFOs in the US and find that 83% of CFOs in their sample have a strict or flexible target leverage ratio. Desai *et al.* (2004) examine the effect of tax deductibility on corporate borrowing. Their results show that firms are more encouraged to issue debt in response to tax incentives. Frank and Goyal (2009) investigate factors that influence corporate capital structure over the period 1950-2003 in the US and find evidence for the trade-off theory. The earlier work of Leary and Roberts (2005) show that firms rebalance their debt-to-equity ratio towards the optimal range. Similarly, Flannery and Rangan (2006) use a partial adjustment model to examine how firms

¹ The NPV is not the only technique that is used to evaluate firms' investments. Firms might also use the payback and the internal rate of return (IRR) to decide whether to take new investments or not.

adjust to targeted leverage ratios. Their results reveal that firms adjust about one-third of their capital structure toward a targeted debt/equity ratio each year. Rongbing and Ritter (2009) obtain similar results.

Although the trade-off theory has explained to some extent the variation of debt-to-equity ratios between firms, it is unable yet to explain why firms with similar risk have different capital structures and why leverage is negatively correlated with profitability (e.g., Fama and French, 2002).

2.1.2.2 Pecking order theory

By relaxing Modigliani and Miller's assumption regarding no asymmetric information, Myers (1984) and Myers and Majluf (1984) develop the pecking order theory of capital structure. This theory explains the behaviour of corporate financing decisions from a different perspective than the former theory. It states that in the presence of asymmetric information, the way a firm finances its investments could convey signals to the market. For example, when firms want to raise funds through issuing equity, investors might evaluate this action as a signal of overvaluation, leading to a drop in the firm's value. According to the pecking order theory, agents can overcome this problem by using internal funds instead. Issuing debt is the second choice because debt financing is less affected by the superior information that the manager has about his company. Equity financing comes as a last alternative due to the fact that investors might interpret this decision as a bad signal and hence harm firm's value.

Shyam-Sunder and Myers (1999) examine the behaviour of corporate capital structure by testing the pecking order and trade-off theories in the US from 1971 to 1989. They find that the pecking order theory explains most of the financing behaviour in US firms, while little support for the trade-off theory is found. Further, they find an explanation for the negative correlation between leverage and profitability. Similarly, Fama and French (2002) report that the pecking order theory justifies the relationship between leverage and profitability.

Using large panel data from 1980 to 2005, Leary and Roberts (2010) find that only 50% of the firm's capital structure behaviour can be explained by the pecking order hypothesis. This percentage increases to 80% when they incorporate other factors considered by other theories.

The study of de Jong *et al.* (2011) compares the prediction of the trade-off theory against the pecking order in American firms from 1985 to 2005. Their results reveal that the pecking order theory is better in explaining corporations' issuing decisions while the repurchase decisions are predicted more accurately by the trade-off hypothesis.

Frank and Goyal (2003) investigate the pecking order theory among US traded firms over the period from 1971 to 1998, and their results show that there is some evidence of the pecking order theory, especially amongst large firms until 1990. However, this aspect of pecking order behaviour is diminished when they include conventional leverage factors and 1990-1998 samples. In fact, they find that firms are more likely to seek external financing through issuing equity than debt, which contradicts the pecking order theory. Similarly, Chen *et al.* (2013) examine the pecking order theory in Taiwanese firms and find results inconsistent with this theory.

2.1.2.3 Market timing theory

Baker and Wurgler (2002) relate market timing to corporate capital structure based on the relaxation of the Modigliani and Miller (1958) assumption of efficient capital markets. More specifically, Baker and Wurgler (2002) examine the influence of market timing on corporate capital structure in US firms by studying the correlation between market-to-book ratios which measures market valuation, and debt-to-equity ratios. They find that corporate market timing has a significant impact on firms' capital structure. Graham and Harvey's (2001) survey shows that about 75% of CFOs consider stock mispricing when they decide to issue debt or equity. This finding reflects the importance of securities' mispricing in corporate financing decisions. Furthermore, the studies of Hovakimian (2006), Kayhan and Titman (2007) and Chen *et al.* (2013) find evidence of the relationship between market timing and the firms' capital structure.

Alti (2006) uses a different approach to examine relationships between corporate financing decisions and equity market timing. More precisely, he investigates to what extent an initial public offering could be captured by market timing and its effect on capital structure. His findings reveal that firms that go public during a hot-market (i.e., high IPO volume in terms of the number of issuers) tend to issue more equity and reduce leverage than cold-market firms in the short run which is inconsistent with the Baker and Wurgler (2002) finding.

Mahajan and Tartaroglu (2008) examine the effect of equity market timing on capital structure in all firms in G-7 countries for the period from 1993 to 2005. Their results show that leverage is negatively correlated with historic market-to-book ratios in G-7 countries, which is consistent with the empirical evidence of Baker and Wurgler (2002). However, when they include the market-to-book ratio as a measure of growth opportunities in the regression, they find a negative correlation between leverage and current growth opportunities which they attribute to being evidence of the trade-off theory.

2.1.2.4 Agency theory and leverage

By relaxing the Modigliani and Miller (1958) assumption of no agency conflict between agent and shareholders, Jensen and Meckling (1976) suggest that corporate debt could be used to align the interest of managers to those of shareholders. That is, managerial ownership and the probability of bankruptcy increase when firms use debt instead of equity to finance new investments. This would lead managers to work toward maximising shareholder's value. Another benefit of using debt is to mitigate the problems associated with overinvestment (e.g., Jensen, 1986). Managers might use firms' resources to obtain private benefits at the expense of shareholders or invest in negative NPV projects due to incompetency. Thus, firm's debt reduces the cash flow available for managers to spend in such value reducing projects. This could potentially explain corporate capital structure behaviour.

Kim and Sorensen (1986) test the relationship between agency problems and corporate financing policy. Their results reveal that agency costs explain the cross sectional variation of corporate debt policy. That is, firms with less agency problems (i.e., high insider ownership) have greater leverage ratios and vice versa. Similarly, the studies of Agrawal and Gershon (1987) and Mehran (1992) find that managerial ownership is positively related to the debt ratio. Harvey *et al.* (2004) investigate the role of corporate debt in reducing the agency problems in emerging markets where extreme conflict of interest between the agent and principals is likely to be present. Their results indicate that leverage mitigates the agency costs and enhance firm's value.

D'Mello and Miranda (2010) examine the influence of long-term debt on overinvestment over a long period (1965-2004) in the US. Their findings reveal that unleveraged firms have high cash ratios which could be potentially overinvested, whilst the introduction of debt leads to a significant drop in the excess cash. Further, they show that the relationship between the reduction in the cash ratio and poor investment opportunities are positively correlated. They also detect a negative association between abnormal capital expenditure and the issue of debt. The impact of reduction in overinvestment is also found to have positive effects on equity value. A recent study of Gomariz and Ballesta (2014) on the relationship between short-term debt and overinvestment in Spanish listed firms, affirms the importance of lower-debt maturity in mitigating the underinvestment and overinvestment problems.

Our review of the corporate finance research in firms' investment and financing decisions has emphasised the importance of agency and information problems. This provides a strong context

for our subsequent focus on the research into corporate dividend policy, which we consider in the next section.

2.1.3 Corporate dividend decisions

Dividend policy has been puzzling researchers for many decades since the seminal work of Miller and Modigliani (1961). Financial economists have developed many theories in attempting to explain the dividend puzzle. The signalling theory of dividend argues that dividend policy has a positive effect on a firm's value. Likewise, the agency theory claims that distributing dividends avoids the agent wasting firm's resources. In contrast, the tax effect theory suggests that dividends are more likely to have a negative impact on firm's stock price. Moreover, a number of other theories have been developed to provide other explanations to why firms pay or change dividends including the life-cycle and the catering theories of dividends.

2.1.3.1 Dividend irrelevance theorem

Miller and Modigliani (1961) argue that in a world with no information asymmetry, taxes and bankruptcy costs, corporate dividend policy has no effect on either the price of a firm's shares or its cost of capital. Thus, dividend policy has no effect on a firms' value. According to this theory, a firm's value is determined only by its basic earnings power and its degree of business risk.

Miller and Modigliani respond to the contrary studies which argue that dividend changes affect share price in the same direction, that is, an increase (decrease) in dividends result in an increase (decrease) in the share price. Their argument states that these effects are attributable not to the dividend itself but rather to the informational content of dividends with respect to future earnings. In other words, the preferences of shareholders for current dividends rather than future capital gains are not responsible for this behaviour. Instead, investors view the changing (up or down) of dividends as a signal that management expects future earnings to change in the same direction. An increase in dividends would be viewed as a positive signal that would lead investors to bid up the share price and vice versa.

A further M and M argument is that a clientele effect exists. A company will attract shareholders whose preferences with respect to the payment and stability of dividends correspond to the payment pattern and stability of the firm itself. This suggests that investors desiring stable and predictable dividends as a source of income would hold the stock of firms that pay about the same dividend amount each period, and investors who favour capital gains would be more attracted to growing firms that reinvest a large portion of their earnings, which results in a fairly unstable

pattern of dividends. Because shareholders get what they expect, M and M argue that the value of their firm's stock is unaffected by dividend policy.

Despite most economists believing that MM's conclusions are correct, given their assumption of perfect and efficient capital markets, it is worth mentioning that the underlying assumptions of their theorem are difficult, and probably impossible, to meet in the real world. After all, when any underlying assumption is violated, the value of a firm is no longer independent of corporate dividend policy.

2.1.3.2 Dividend signalling theory

The signalling theory of dividends suggests that firms use dividends' to convey information about their future prospects, given the assumption that agents possess more information about their firms than investors. Lintner's (1956) survey shows that managers change their dividends in a smooth and gradual manner over time, towards a target payout ratio. Thus, they avoid large 'swings' in dividends over time.

Bhattacharya (1979) develops a dividend signalling model where he shows that corporate cash dividends can be viewed as a mechanism to reduce the asymmetric information between the agent and the shareholders. According to his argument, managers can use dividends as a signal of future cash flow. Further, Bhattacharya (1979) demonstrates that the higher the cost of signalling, the more informative dividends should be about the expected cash flow. According to his model, tax on dividends makes dividends more costly which in turn strengthens the credibility of the information that is conveyed through dividends. That is, the higher the tax on dividends the more the dividends should signal about the future cash flow. This would separate good firms from bad firms as it is costly for the latter to imitate. This argument is also supported by the theoretical model of John and Williams (1985), where they show that taxable dividends are used by managers to convey private information that is not captured by other published reports such as audited annual reports. Taken together, these models demonstrate that dividends should be more informative when they are taxable.

The empirical studies of this hypothesis tend to focus on two factors: a) the effect of dividends on stock prices (that is, market reaction to dividends), and b) the relationship between dividends and earnings. The earlier works on the relationship between dividend changes and stock prices reveal that the stock price reacts positively (negatively) to the announcement of dividend increases (decreases) which is in line with the signalling theory. The empirical studies in the US, and other developed markets, affirm that dividend changes are positively associated with stock price

adjustment in the same direction (e.g., Pettit, 1972; Charest, 1978; Aharony and Swary, 1980; Asquith and Mullins, 1983; Kane *et al.*, 1984; Bajaj and Anand, 1995; Nissim and Ziv, 2001; Gunasekarage and Power, 2002; Harada and Nguyen, 2005; Lie, 2005; Dasilas and Leventis, 2011). In the UK, Lonie *et al.* (1996) use a sample of 620 UK. Their results are in line with earlier studies that are conducted in the US. That is, firms that increase (decrease) dividends exhibit a positive (negative) significant abnormal stock return in the announcement date. McCluskey *et al.* (2006) detect similar results in the case of dividend increases using a sample of 50 Irish Companies for the period 1987-2001. McCaffrey and Hamill (2000) find that market reacts positively to dividend initiation announcement in UK firms.

Furthermore, the studies in the emerging markets detect similar results to those in the developed markets. For example, Thirumalvalavan and Sunitha (2006) detect that the market reacts positively to dividend announcements in the Indian market. Al-Yahyaee *et al.* (2011) empirically examine the market reaction to the announcement of dividend increases in the Omani market and find evidence for the signalling theory. Similarly, in Jordan, Al-Shttarat *et al.* (2013) show that there is a significant abnormal return following the announcement of dividend increases.

However, it remains unclear what the nature of the relationship between dividend changes and future *earnings* is. In fact, the empirical results reveal mixed conclusions. Watt (1973) conducts an early study of the information content of dividend announcements and finds that the dividend conveys little information about future earnings. Likewise, Gonedes (1978) detects that dividend changes are not informative about future earnings. DeAngelo *et al.* (1996) study the information content of dividends in NYSE-listed firms that experience a reduction in earnings after a long term of earnings growth. Their finding reveals that dividends are not a reliable signal of future earnings which is inconsistent with the dividend signalling theory. Benartzi *et al.* (1997) investigate the relationship between dividend announcements and past, current and future earnings in the US. Their result shows that there is a high correlation between dividend changes and concurrent earnings changes. However, they find that dividend changes are uncorrelated with future earnings changes. Moreover, Li and Zhao (2008) empirically find that firms with greater asymmetric information are less likely to pay, initiate or increase dividends in the US.

In line with the dividend signalling hypothesis, Brickley (1983) examines the relationship between the payment of special dividends and regular dividend increases, and current and future earnings. He finds that earnings are increased in the current and subsequent year following these announcements which is consistent with the signalling theory. By employing a large sample of quarterly cash dividend changes, Aharony and Dotan (1994) find that dividend increasing

(decreasing) firms exhibit on average greater (smaller) unexpected earnings changes in the subsequent years. Nissim and Ziv (2001) study the information content of dividends in the US for the period of 1963 to 1998. Their results show that dividend changes are positively associated with future earnings changes. Likewise, the earlier studies of Chen and Wu (1999), Harada and Nguyen (2005) and Stacescu (2006) present evidence consistent with the dividend signalling hypothesis.

Other studies also examine the revision in earnings forecasts following dividend changes. Carroll (1995) finds a positive relationship between dividend changes and analysts' forecasted revisions spanning up to five quarters ahead. Furthermore, Ofer and Siegel (1987), Denis *et al.* (1994) and Yoon and Starks (1995) report that analysts revise earnings forecasts after dividend changes.

Healy and Palepu (1988) study the earnings performance surrounding dividend initiation and omission in the US. They find evidence that dividend initiated firms experience a positive earnings changes before (at least one year), during and after (up to two years) the dividend changing year which is in line with the information content of dividend. However, this tendency is not affirmed in the dividend omitting firms. They attribute the latter finding to the potential survival bias in the dividend omission sample. A similar study is conducted by Ho and Wu (2001) while taking into account the problem associated with survivorship bias. Unlike the results reported by Healy and Palepu (1988), their findings reveal that there is an insignificant earnings increase following dividend initiation and omission. Balachandran *et al.* (1996) examine the association between interim dividend cuts and omissions of future earnings in the UK. Their results indicate the signalling power of interim dividend cuts and omissions on future earnings changes.

The inconclusive results on the relationship between dividend changes and future earnings in the previous literature prompted a further investigation on this issue. For example, Joos and Plesko (2004) take a different approach to test the information content of dividends. They argue that dividends could signal future earnings changes when it is too costly for a firm. The signal is too costly when a firm increases dividends at a time when it has a current loss and a negative cash flow. They compare this group with those firms that increase dividends and have a current loss and a positive cash flow. Their result shows that dividend increases provide information about future performance in the group where the signal is too costly. Another explanation for the mixed findings in the previous studies is reported by Grullon *et al.* (2005). They argue that the contradictory results in the previous studies might be attributed to the assumption of the linearity of mean reversion in earnings. After controlling for this issue through using the partial-adjustment model for profitability developed by Fama and French (2000), they detect that dividend changes provide no information about future earnings changes. A very recent study by Aggarwal *et al.*

(2012) argue that the inconclusive results on the relationship between dividends and future earnings in the previous studies might occur due to the variation in asymmetric information among public firms which insufficiently provides adequate testing power in the US. They use a sample of foreign firms that cross-list on US stock market in the form of American Depositary Receipts (ADRs) which represents firms with a poor information environment. Their results reveal a strong association between dividend increases and future earnings among those firms which is in line with the signalling hypothesis. However, they do not find support for this in the case of dividend decreases.

Earlier studies of Kane *et al.* (1984), Easton (1991), Lonie *et al.* (1996) and McCluskey *et al.* (2006) investigate the effect of the *joint* announcement of dividend and earnings on stock prices. Kane *et al.* (1984) study the corroborative effect of the two signals on stock prices in the US. In their study, the earnings and dividend announcements are divided into six groups: dividend-increase and earnings-increase, dividend-increase and earnings-decrease, dividend-decrease and earnings-increase, dividend-decrease and earnings-decrease, dividend-no-change and earnings-increase, and dividend-no-change and earnings-decrease. They find that there is a statistically significant interaction effect, hence, supporting the corroboration hypothesis. Subsequent studies of Easton (1991) in Australia, Lonie *et al.* (1996) in the UK and McCluskey *et al.* (2006) in Ireland reveal similar results. Overall these studies suggest the importance of the two announcements in explaining the abnormal stock return.

Recent studies find that share repurchases have become globally popular and the market reacts positively to this announcement: there is a positive correlation between the announcement of share repurchases and stock prices (e.g., Chowdhrya and Nanda, 1996; Isagawa, 2002; Grullon and Michaely, 2004; Oded, 2005).

2.1.3.3 Agency cost and dividends

According to agency theory, a conflict of interests arises as a result of the separation of ownership and control due to the fact that agents do not always act in the interest of shareholders (Jensen and Meckling, 1976). Managers may use the excess cash to invest in bad projects either to advance their own interest or due to incompetency. Hence, corporate dividend policy can play a crucial role in aligning the interests of managers to those of shareholders. Managers distribute dividends to commit not to use firms' free cash flows in private benefits and to eliminate the overinvestment problem (Rozeff, 1982; Easterbrook, 1984; Jensen, 1986; Crutchley and Hansen, 1989; Jensen *et al.*, 1992; Alli *et al.*, 1993; Saxena, 1999; Mollah *et al.*, 2000).

Furthermore, paying high dividends reduces the internal cash flow and forces firms to seek external financing from the capital markets which imposes further monitoring by the capital markets (Easterbrook, 1984). Thus, this monitoring reduces the agency costs and enhances the firms' value. Another potential conflict may exist between shareholders and bondholders. On the one hand, shareholders may set a high level of dividend in order to expropriate wealth from bondholders which reduces the amount of funds available to bondholders (Jensen and Meckling, 1976). On the other hand, bondholders would prefer to impose some restrictions on the dividend payments in order to make sure that the firm has enough money to pay its debt (Smith and Warner, 1979; Kalay, 1982).²

Numerous studies have attempted to provide an explanation for dividend payments through addressing agency costs. For example, Rozeff (1982) empirically investigates the relation between agency cost and dividend policy for 1,000 non-regulated firms in the US over the period 1974 to 1980. He finds that agency costs are a very important factor in determining the dividend policy. Specifically, he demonstrates that firms tend to pay high dividends when insiders have a lower fraction of the equity and/or the majority of equity is owned by outsiders. Dempsey and Laber (1992) conduct a similar study to Rozeff (1982) for the period from 1981 to 1987 where this period is characterized by low inflation, stronger economic growth and lower taxes compared to the period used in Rozeff (1982)'s study. Their results continue to hold in the latter period suggesting that the agency problem and dividend payout are highly associated.

Holder *et al.* (1998) use a sample of 477 US firms from 1980 to 1990, and find that insider ownership and dividend payout are negatively related. They also detect a positive correlation between dividend payout and the number of shareholders. Likewise, Saxena (1999) studies the determination of dividend policy in NYSE-listed firms and demonstrates that agency costs have a major influence on dividend policy.

Lang and Litzenberger (1989) empirically examine the free cash flow signalling hypothesis in the US. They compare the market reaction to the dividend announcement between groups of firms that are overinvesting with those that are not. Their results show a strong market reaction to dividend announcements for overinvesting firms, which supports the cash flow hypothesis. Likewise, Gugler and Yurtoglu (2003) study the market reaction to the announcement of dividends

² Firms' leverage is represented to be another mechanism that aligns managers' interest to those of shareholders. Jensen (1986) affirms that corporate debt could serve as substitute for dividends in eliminating the agency problem. Likewise, Margaritis and Psillaki (2010) find a negative association between leverage and corporate dividend policy.

in Germany and document a high market reaction to the announcement of dividends in firms with overinvestments.

However, Grinstein and Michaely (2005) investigate the association between institutional holdings and payout policy in US firms over the period 1980 to 1996. Their results reveal that institutional holdings are not related to dividend policy, which is inconsistent with agency theory. Also, they find no evidence with regard to the use of dividend policy by institutions to control and monitor management actions. Consistent with this result, Brav *et al.* (2005) find that about 87% of executives do not agree with the use of dividend policy as a means of imposing self-discipline. Denis *et al.* (1997) report that CEO turnover is higher and more sensitive to performance in firms with outside blockholders. Denis and Serrano (1996), and Bhagat *et al.* (2004) affirm that firms with large blockholders perform better than those with few outside blockholders. This evidence suggests that, from an agency perspective, management actions are sufficiently monitored in firms that have large outside shareholders. Hence, dividends may not be an appropriate device to monitor management actions in the presence of large outside shareholders (Oswald and Young, 2008). In line with this argument, Bartram *et al.* (2012) report that firms make higher payouts when they have lower ownership concentrations (i.e., higher agency costs).

In contrast, recent studies show that large owners can use firm resources to generate private benefits at the expense of minority shareholders (e.g., Shleifer and Vishny, 1997; Holderness, 2003). Jensen (1986) argues that firms are likely to pay out their free cash flow when they are highly monitored. Faccio *et al.* (2001) detect that the dividend payout is higher in firms with lower agency conflicts. The theoretical model developed by Fluck (1999) demonstrates that an increase in the external shareholders' power might encourage managers to pay higher dividends in order to commit not to waste firms resources on private benefits. Furthermore, previous studies reveal that ownership concentration is negatively related to disclosure levels. For instance, Fan and Wong (2002) point out that outside investors and analysts have little confidence in the reported earnings in firms with high ownership concentrations. Hope (2003) affirms that there is a negative association between ownership concentration and disclosure level.

Many other studies provide evidence for the agency theory using data from outside the US. Mollah *et al.* (2000) study the importance of agency costs in determining the dividend policy. Their findings reveal that dividend policy is significantly related to agency costs. Using data from 33 countries around the world, La Porta *et al.* (2000) demonstrate that firms pay higher dividends in countries with better shareholder protection. Earlier works of Manos (2002) in India, Zeng (2003)

in Canada, and Chen and Dhiensiri (2009) in New Zealand find evidence consistent with the agency theory of dividends. However, Chay and Suh (2005) examine the determinants of dividend policy in 24 countries and their study reveals weak evidence for the agency theory of dividends.

2.1.3.4 Tax clientele effect

The tax effect represents another school of thought which explains the relevance of the dividend decision. The tax clientele theory basically argues that the imperfection caused by the different tax treatments on dividends and capital gains, justifies the payout policy in corporations for two reasons. First, dividends are taxed more heavily than capital gains. Second, dividends are taxed immediately, whereas tax on capital gains are deferred until investors sell their shares. For these reasons, corporate dividends are less desirable than capital gains and a negative correlation between dividends and firm's value should be expected (Brennan, 1970; Litzenberger and Ramaswamy, 1979). Thus, investors with less tax advantages prefer firms that retain most of their earnings to avoid future tax liabilities.

Miller and Modigliani (1961) note that the tax on dividends could play a crucial role in corporate payout policy. However, they argue that investors can sort themselves into clienteles to reduce the overall tax bill. That is, low-tax investors could prefer dividend-paying firms while high-tax investors prefer capital gains. Therefore, if the investors' preferences exactly match the distribution of a firm's payout policy, the value of a firm is independent of its dividend policy.

There are many empirical studies that support the tax-effect hypothesis. The earlier study of Pettit (1977) examines the effect of tax on an individual investor's portfolio. His study provides evidence to the clientele effect of dividend. More specifically, he finds a positive (negative) association between portfolio's dividend yields and investors' ages (investors' income). Likewise, Lewellen *et al.* (1978) report that high-tax investors are attracted by low dividend yield firms and vice versa. Graham and Kumar (2006) offer further support to the clientele hypothesis of dividends by investigating the stock holdings and trading behavior among a large number of households in the US. Their results reveal that older and low income investors prefer to hold shares in high dividend-paying firms. Also, they find that this trend continues to hold when it comes to their trading behaviour: those investors buy shares before the ex-dividend day.

In a unique market where the capital gains tax is zero: Taiwan, Lee *et al.* (2006) study the tax dividend clientele effect, and find that investors subject to high tax rates on dividends tend to retain stocks with lower dividends. Further, their results show that investors in lower tax brackets buy stocks that raise dividends and vice versa. This pattern is consistent with the dividend clientele

hypothesis. More recently, Dahlquist *et al.* (2014) examine the dividend tax clienteles in Swedish stock markets over the period from 2001 to 2005. They find that investment funds which are subject to higher tax rates on dividends than capital gains acquire less dividend-paying stocks in their portfolios.

2.1.3.5 The Life-cycle theory of dividends

The life cycle theory suggests that firm's resources, ability to access capital markets, and investment opportunities vary over a firm's life (Mueller, 1972). For example, at an early stage, firms tend to have limited initial resources which leads firms to invest most of their resources in building itself (e.g., investing in product development and marketing). A growth stage occurs when the firm expands its customers and exploits the market potential. At a later stage, firms reach a period where investment opportunities disappear and market competition increases, which is called the "maturity stage".

The different characteristics of a firm over its life cycle are more likely to lead managers to adjust firm's dividend policy accordingly. That is, at the early and growth stages, the firm tends to pay no or a low level of dividends, as they need to retain cash to overcome the potential problems associated with these stages. However, when a firm reaches the maturity level, the opposite tendency is more likely to be found. That is, not many good investment opportunities are left and a firm is more likely to have a high cash flow. In this matter, the firm has a high tendency to discharge its cash to its shareholders through, for example, dividends.

Grullon *et al.* (2002) use a sample of 7,642 dividend change announcements for the period from 1967 to 1993 and find support for the life cycle theory of dividends. In their study, they find that dividend-increasing firms tend to experience a decline in their profitability after this announcement and their capital expenditure is unaffected in the following years. They also detect that dividend-decreasing firms exhibit an increase in their profitability in the subsequent years. These findings are inconsistent with the signalling theory of dividends. Furthermore, the systematic risk is found to decline around the announcement of dividend increases which leads to a reduction in the cost of capital. This in turn, is argued to explain the positive association between dividend increases and stock prices. Based on these findings, Grullon *et al.* (2002) suggest that dividend increases convey information about changes in a firm's life cycle. That is, when a firm moves from high growth to maturity stage, their investment opportunity set declines which is represented by a reduction in the firm's retained earnings, growth rates and risk.

The earlier work of Fama and French (2001) studies the dividend policy in listed firms in the US and detects a decrease in dividend policy among those firms. They attribute their findings to the increase in the number of firms with a small size, low profitability and high growth. This finding suggests that firms at the initial stage are less likely to set progressive dividend decisions.

DeAngelo *et al.* (2006) use the earned/contributed capital mix as a proxy for mature firms. Their study shows that the tendency to pay a dividend is high (low) when retained earnings are high (low). Further, they report that the earned/contributed capital mix is significantly related to the propensity for dividend distribution which is in line with the life cycle theory of dividends. Likewise, Denis and Osobov (2008) investigate the propensity to pay dividends in six developed markets using the ratio of retained earnings to total equity to proxy mature firms. Their results reveal that there is a high tendency to pay dividends in firms with high earnings to equity ratios which supports the life cycle theory.

2.1.3.6 Catering theory of dividends

Theories discussed in the previous sections are developed on the assumption that managers and investors are rational. Within behavioural corporate finance, Baker et al. (2006) identify two approaches: a) irrational investors approach with rational manager, b) irrational managers approach with rational investors. The irrational investors approach examines how rational managers may exploit irrationality in the financial markets: e.g. by market timing when securities are mispriced by irrational investors, and by catering to irrational investors' demands.³

The catering theory of dividends developed by Baker and Wurgler (2004) argues that investors demand for dividends varies over time. This would cause the stock price of dividend-paying and non-dividend paying firms to vary accordingly. Therefore, managers respond by paying dividends to investors when investors place a premium on dividend-paying stocks and not paying dividends when there is no premium placed on a stock. Using a sample from 1962 to 2000, they empirically find that on aggregate dividend initiations are positively association with the dividend's premium and managers tend to pay dividends when there is a dividend premium. They also detect that managers omit dividends when investors favour non-paying firms.

Supportively, Li and Li (2006) provide evidence for the catering theory after extending Baker and Wurgler's model and incorporate other dividend levels (dividend increase and decrease). They find that the tendency to increase (decrease) dividends is high (low) when the dividend premium

³ The irrational manager approach will be discussed in detail in section 2.4.

is high (low). Furthermore, the magnitude of increasing (decreasing) dividend is greater when the dividend premium is high (low). Moreover, they document that the level of dividend changes (increase or decrease) and the dividend premium has an impact on stock returns. That is, there is a positive (negative) relation between the stock returns and dividend premium for dividend increases (decreases). However, Li and Li (2006) find a negative relation between the cash ratio and dividend increases. Furthermore, they find a negative relation between market to book ratio and dividend increases and decreases. They suggest that the market to book ratio serves a dual purpose. That is, in case of dividend increases (decreases) it measures the investment opportunities (past and expected future earnings).

Thus, the findings of the earlier studies of Baker and Wurgler (2004) and Li and Li (2006) suggests that managers should consider varying investors' demand when they make dividend decisions. Also, managers are penalized via a lower stock price when they could not fulfil this condition (that is, responding to investors demand). Hoberg and Nagpurnanand (2009) re-examine the dividend catering theory in the US from 1963 to 2004. The results reveal strong evidence for the catering theory of dividends over that period (consistent with Baker and Wurgler, 2004). However, once they control for risk, the relationship between the propensity to pay dividends and dividend premium no longer exist. They attribute this finding to the importance of risk, not the catering theory of dividends, to explain dividends' behaviour.

In the international context, Denis et al. (2008) examine the catering theory of dividends in six developed countries (i.e., US, Canada, UK, Germany, France and Japan) over the period 1994 and 2002. Their findings show little evidence for the catering theory of dividends outside the US. Likewise, Eije and Megginson (2008) explore the payout policies in the European Union during the period 1989-2005. Their findings demonstrate that the catering theory of dividends is irrelevant in those countries. In a sample of 23 countries, Ferris *et al.* (2009) investigate the catering theory of dividends over 1995-2004. They find that catering is more likely to present in common than civil law countries. A possible explanation for this finding, according to the authors, is that investors in common law countries exhibit a wider set of rights and protection compared to those in civil law countries. This would probably increase the ability of shareholders in the former countries to force managers to pay dividends.

2.1.3.7 Potential undervaluation and dividends

The disappearance of dividends (Fama and French, 2001) and the increase in the popularity of share repurchases has recently attracted the attention of researchers. Different hypotheses have

been developed to explain why the tendency toward share repurchases has increased recently: these include signalling, capital structure adjustments, takeover defence, excess cash distribution, substitution for cash dividends and wealth expropriation from bondholders. Signalling or undervaluation seems to be the most prevalent explanation for open market repurchases (e.g., Dann, 1981; Wansley et al., 1989; Ikenberry et al., 1995). That is, managers use open market repurchase to convey to the market that their stocks are potentially undervalued and hence transfer wealth to shareholders.

Ikenberry et al. (1995) report a positive link between repurchases and abnormal returns in value stocks. Specifically, they find a long run abnormal return in stocks with high book-to-market ratio, consistent with the empirical findings of Zhang (2005). They attribute their findings to the undervaluation of these stocks. That is, stocks with high a book-to-market ratio are more likely to be undervalued. They also argue that repurchasing motivations in low book-to-market firms is not dominated by undervaluation. Likewise, Chan et al. (2010) affirm a positive correlation between repurchase announcement returns (and actual repurchases amount) and a high book-to-market ratio in the short run. Similarly, in a CFO survey by Brav et al. (2005), it is found that the main reason for open market repurchases is stock undervaluation. Thus, this implies that potentially undervalued firms are expected to reduce dividends more compared to non-undervalued peers.

2.2 Managerial compensations and corporate financial policies

Executive compensation contracts have been considered by shareholders to promote alignment of agents' interests to those of shareholders. Studies in this area have affirmed the importance of this element in mitigating the agency problems and hence, enhancing shareholders' value. This section reviews the relevant literature.

2.2.1 Executive pay package

The executive compensation contract consists mainly of cash and equity-based compensations. The cash compensation can be in the form of a fixed salary and annual bonus whereas the stock options and long-term incentive plans (LTIPs) are equity-based compensation. Prior studies affirm the importance of executive compensation to address the agency problem between agent and principle (e.g., Jensen and Meckling, 1976; Holmstrom, 1979; Haugen and Senbet, 1981; Murphy, 1999; Core *et al.*, 2003).

Managerial salaries are crucial in attracting managers. However, this flat payoff leads managers to have no incentives to take risky projects (Lambert *et al.*, 1991). The annual bonus is paid to managers based on their achievement of threshold performance in current year. Under this type of

compensation, managers may be encouraged to take negative NPV projects that yield sufficiently high return in the current year or may make managers focus on projects with shorter life-span which lead them, in some cases, to pass value-added long-term projects (Narayanan, 1996). Therefore, the cash compensation alone establishes no link between managers' wealth and long-term firms' performance.

The introduction of equity-based compensation such as LTIPs and stock options encourages managers to think more strategically in making financial decisions because their wealth is tied to long-term corporate performance. The structure of the equity-based compensation induces managers to take more risk which overcomes the problem associated with cash compensation. However, this also might lead managers to take excessive risks due to the convexity of stock options. The report of Greenbury (1995) favours LTIPs over stock options because the former does not display convex payoff structure. However, no conclusion has been made on which type (LTIPs or stock options) leads to optimal risk-taking (Lee *et al.*, 2007).

Taking together, the compensation package has to be well structured in order to eliminate the problems associated with each type of reward. For example if the constructed pay package depends heavily on salary and bonus, then a manager is more likely to work toward increasing the current year performance and avoid taking risky projects (underinvestment) which may in fact destroy a firm's value in the long-run. On the other hand, equity based compensation might lead manager to take more risky investments (overinvestment). Therefore, the board of directors should consider the optimal mix of compensation's elements when designing a managerial contract in order to align the interests of manager to those of shareholders. Lewellen *et al.* (1987) find evidence that firms set compensation packages to address agency costs.

Stock options are considered as a key element of equity-based compensation. Their popularity has increased remarkably in last two decades. For example, 83% of the largest 100 US firms had option plans in 1980 (Smith and Watts, 1982). Hall and Murphy (2002) report that in the US 82% of firms listed in S&P 500 granted options to their top executives and this percentage has increased by approximately 15% in 1999, reaching to 94%. Also, the value of stock options in the compensation package has value of about 47% in 1999 compared to 21% in 1992. In the UK, Conyon and Murphy (2000) report that CEOs' total compensations in the 500 largest UK firms are about £300 million and 22% of which are stock options.

These differences between the US and the UK is studied by Kyriacou *et al.* (2010). They show that executive in the US are more likely to sell all the stock acquired at exercise, where less than

50% of those stock sold by UK executives. Further, they point out different explanations of why and why not UK executives tend to exercise their stock options early. The four times emoluments rule⁴ restricts the value of options held by CEOs to four times of base salary plus bonuses. Thus, a CEO who is granted the maximum amount of options might be more encouraged to exercise his options in order to provide a space for the granting of additional options. However, the ability to defer the tax liability before 1995 gave UK executives incentives to hold the stock acquired at exercise.⁵

Several studies investigate the effect of executive stock options on corporate financial decisions. This literature is discussed briefly in the following sections.⁶

2.2.2 Executive compensation, risk-aversion and investments

The feature of stock options is that managers are rewarded when a firm's stock price increases, but no punishments are imposed on managers when stock price decreases. Thus, this type of convexity payoff motivates managers to take more risky projects (Gervais *et al.*, 2003) and hence mitigates the problems associated with CEO risk aversion. Rajgopal and Shevlin (2002) study the impact of executive stock options (ESOs) and other incentives on managerial risk taking. They find that ESOs motivate risk-averse managers to invest in risky projects and hence, eliminate the risk-related investment problem. This evidence has also been supported by a recent work of Heron and Lie (2013).

A prior work of Lewellen *et al.* (1987) studies to what extent firms use cash and equity-based compensation packages to mitigate agency costs. Their findings reveal that stock related compensation is significantly and positively related to fixed assets, growth, and leverage. However, salary and cash bonus elements are negatively correlated with fixed assets and growth.

Agrawal and Gershon (1987) study the impact of managerial holdings of common stock and stock options on investment and financing decisions of 294 firms listed in NYSE and AMEX for the period from 1974 to 1982. Their study detects that managerial stock holdings play a vital role in eliminating the agency problem. Specifically, they find that managers make the best investment

⁴ For more details see Kyriacou *et al.* (2010).

⁵ At that time tax was paid on the gain from selling shares. Since July 1995, tax on options must be paid at exercise date regardless whether or not the gain released.

⁶ Although the focus of the thesis on dividend policy, many studies find evidence of the impact of executive stock options on corporate financial policies. Furthermore, chapter 5 deals with overconfident managers and dividend policy in which managerial stock options are used to proxy managerial overconfidence.

decisions that increase shareholder value when they have high security holdings. Also, they find a positive association between the debt-equity ratio and holdings of firm's securities by managers.

The earlier study of Larcker (1983) investigates the relation between the adoption of performance plans in executive compensation packages, and investment decisions and stock market performance in the US over the period 1971 to 1978.⁷ The study reveals that there is a positive association between the adoption of performance plans and investment decisions and there is an abnormal stock return following the announcement of these plans compared with firms that had not adopted a performance plan. Likewise, other studies on the relation between equity-based compensations and stock performance detect a positive association between long-term incentives and abnormal stock return (Brickley *et al.*, 1985; DeFusco *et al.*, 1990).

Datta *et al.* (2001) show that stock options lead managers to take the best long term investments and hence increase shareholders' value. Similarly, Guay (1999) detects a positive association between stock price volatility and stock options, suggesting that stock options have an impact on firms' financing and investment decisions. Ju *et al.* (2002), investigates the impact of options on managerial compensation and finds that stock options can induce either too much or too little corporate risk taking, depending on managerial risk aversion and the underlying investment technology.

DeFusco *et al.* (1991) empirically investigate the effect of changes in stock option plan on long-run firms' performance and financial policies for US firms between 1978 and 1982. Their results reveal a reduction in stock price, firms' profitability and investments following the change in executive stock option plans.

Gaver and Gaver (1995) study the executive pay components in high growth and non-growth firms, using a sample of 1000 US firms in 1992. The results show that firms with many investment opportunities pay more total compensation than non-growth firms. Also, they find that most of the executive compensation in high growth (non-growth) firms is driven from long term incentives (fixed salary).⁸

A recent study by Athanasakou *et al.* (2013) examine the change in CEO compensation following periods of high investment in the US. Their results reveal a reduction in CEO options granted

⁷ Performance plans are different from other long term executive compensation packages (see Larcker, 1983 for more details).

⁸They argue that asymmetric information should be higher in growth firms and hence, long-term incentives reduce the agency problem between shareholders and agent.

subsequent to high investment periods. They also find that, when CEOs have more in the money options, firms pay them fewer options in the following years.

2.2.3 Executive compensation and dividend policy

A substantial body of academic literature studies the effect of executive compensation packages on the dividend policy (e.g., Lambert *et al.*, 1989; Jolls, 1998; Weisbenner, 2000; Fenn and Liang, 2001).

Lewellen *et al.* (1987) study the effect of each component of executive compensation packages (salary and bonus compensation and stock related compensation) on dividend policy. Their study reveals that there is a significant positive association between the dividend payout ratio and the percentage of managers' salary and cash bonus compensations, and negative but insignificant correlation with stock related compensations.

Lambert *et al.* (1989) conduct the first study examining the effect of introducing stock options as a part of executive compensation package on dividend policy decisions using a sample of 221 large US firms. Their findings show that there is a negative association between stock options and dividend policy decisions. In other words, the introduction of stock options in the compensation package leads managers to reduce dividends below the expected level and the higher percentage of stock options in executive compensation package leads firms to reduce dividend ratio. They argue that the reason for this is because executive stock options plans are not dividend protected.

Fenn and Liang (2001) study the influence of managerial stock incentives (stock ownership and stock options) on corporate payout policy. Their sample consists of 1100 non-financial firms in the US for the period from 1993 to 1997. They find that in firms with a high potential of agency costs (those with low management stock ownership, few investment opportunities, and high cash flow) management stock ownership is positively correlated with payout ratio. However, they find no supporting evidence in firms with high management ownership, more investment opportunities and limited cash flow. In addition, they find a significant negative correlation between management stock options and dividend, and positive correlation between management stock options and repurchases.

Aboody and Kasnik (2001) investigate the association between executive stock options and firms' payout policy. Their study involves a sample of 1354 US firms over the period from 1992 to 1998. Their results show that CEOs with stock options are more likely to favour share repurchase over dividends. Also, they find that restricted stock is negatively correlated with stock options.

A study carried out by Kato *et al.* (2005) investigates the effect of the adoption of stock options plans on financial decisions and firms performance by Japanese firms for the period from 1997 to 2001. Their results reveal that dividend policy and volatility are unaffected. They also find that firms which introduce stock options experience higher abnormal return, high growth and less leverage compared with firms that have not introduced stock options plans.

Liljeblom and Pasternack (2006) examine the influence of employee and executive stock options on the firms' payout policy. They document a positive correlation between stock options and dividend payout in firms with dividend protected options. However, in firms without dividend protected options, they find insignificant negative association between dividend payments and stock options.

Similarly, using a sample of 1035 Taiwanese firms during the period from 2000 to 2005, Wu *et al.* (2008) study the effect of protected employee stock options on stock repurchases and cash dividends. Their study demonstrates a positive relation between protected executive stock options and cash dividend distribution.

Cuny *et al.* (2009) study the impact of executive stock options on total payout (dividends and repurchases). Their results show that there is negative relationship between executive stock options and total payout. Similarly, Boumosleh and Cline (2013) detect a negative relationship between CEOs options and dividend policy, and Li *et al.* (2014) find that CEOs with high stock options ownership are less likely to pay dividends. This is due to lack of dividend protection

2.3 CEO traits and corporate governance

2.3.1 CEO traits

Recent studies demonstrate that managerial traits have a non-trivial impact on corporate financial decisions. Earlier studies find that CEO personality has explanatory power in explaining capital structure (Cronqvist *et al.*, 2012) and financial choice (Malmendier *et al.*, 2011). However, the association between managerial traits and firm performance reveals mixed conclusions.

Recent studies show that CEO power, measured by CEO-Chair duality, CEO-time in role and CEO-Ownership increases entrepreneurialism (Sah and Stiglitz, 1991); encourages CEOs to take risky decisions (Adams *et al.*, 2005); reduces board members' effectiveness (Combs *et al.*, 2007; Liu and Jiraporn, 2010; Jiraporn *et al.*, 2012); and creates moral hazard problems (Adams and Ferreira, 2007). Hence, CEOs with more power in their firms will be more likely to act on their desires and make the decisions that they want.

The CEO's time in the role can also enable CEOs to align their interest with those of the board's directors and can potentially strengthen their influence over the board. For instance, Hermalin and Weisbach (1998) theoretically demonstrate that CEOs with more tenure are able to select board members in their favour and decrease the composition of outside directors on the board, indicating an increase in the CEOs' power. Further, Hill and Phan (1991) find that CEOs' tenure increases the influence of CEOs over the boards.

The age of the CEOs can also influence the decision-making process. Shefrin (2008) reports that until the age of 70, personal risk aversion is positively related to age, then this relation is revised, representing a nonlinear relationship between age and personal risk aversion. Agarwal et al. (2007) empirically find that firms' financial decisions vary with age. Yim (2013) affirms that a firm's acquisition behaviour declines with CEO age.

2.3.2 Corporate governance

2.3.2.1 Board structure

The literature on corporate governance demonstrates the crucial role of board structure in monitoring the firm's management (e.g., Mace, 1986; Adams and Ferreira, 2007). Board size and board composition have attracted the attention of many recent studies.

The earlier studies demonstrate the importance of board size in mitigating the conflict between the principal and the agent (Lipton and Lorsch, 1992; Jensen, 1993; Yermack, 1996; Eisenberg et al., 1998). Whether large or small board members are efficient in monitoring the management has been debated in the literature. Large board membership adds more expertise which strengthens the relation between corporate performance and the external market (Pearce and Zahra, 1991); and reduces the autonomy of the CEO decision-making (Conyon and Peck, 1998; Guest, 2008). However, other studies show that smaller board membership is better functioning than large board membership (Lipton and Lorsch, 1992; Jensen, 1993). The free rider problem is more likely to be present when board size becomes large and has been empirically supported by the previous work (e.g., Yermack, 1996; Eisenberg et al., 1998; Mak and Kusnadi, 2005).

Regarding board composition, the literature documents that a large proportion of outside directors on the board is perceived as a strong signal of efficient monitoring of managers by the capital market. For instance, Fama and Jensen (1983) report that the non-executive directors on the board have an incentive to build reputation as expert monitors and to act in favour of the shareholder's interest. Moreover, others report that the proportion of outside directors is positively correlated with disciplinary turnover among executives (Weisbach, 1988); stock price reaction to takeover

bids (Byrd and Hickman 1992); corporate performance (Bhagat and Black, 1999); and influencing CEO authority (Adams et al., 2005; Combs et al., 2007).

The earlier studies detect the important role of dividend policy to mitigate the conflict of interest between managers and shareholders (e.g., Rozeff, 1982; Easterbrook, 1984; Jensen et al., 1992). This might indicate that effective board structure uses dividends as a device to alleviate the agency problems associated with free cash flow. However, the literature reveals mixed results on the correlation between board size and board composition, and dividend policy. For instance, Chen et al. (2005) find that dividend policy is unaffected by board size and board composition. In contrast, Adjaoud and Ben-Amar (2010) report that board composition is positively related to dividend payout. Furthermore, Boumosleh and Cline (2013) show that both board size and board composition have a positive impact on paying dividends.

Although the literature generally demonstrates the important role of board size and board composition in aligning manager's interest to those of shareholders, which in turn mitigates the free cash flow problems, no conclusion is made with regard to the association of these factors with dividend policy.

2.3.2.2 Ownership structure

Ownership structure has been documented as having a significant impact on monitoring internal management and influencing corporate financial policy. The majority of recent studies focus on ownership concentration and institutional holdings. Denis et al. (1997) report that CEO turnover is high and more sensitive to performance in firms with outside blockholders. Denis and Serrano (1996) and Bhagat et al. (2004) affirm that firms with large blockholders perform better than those with few outside blockholders. This evidence suggests that management actions are sufficiently monitored in firms that have large outside shareholders. Hence, payout policy may not be an appropriate device to monitor management actions in the presence of large outside shareholders (Oswald and Young, 2008). In line with this argument, Bartram et al. (2012) report that firms make higher payout when they have lower ownership concentration (i.e., high agency costs). We expect dividends and ownership concentration to be negatively correlated.

However, other studies show that large owners can use firm resources to generate private benefits at the expenses of minority shareholders (e.g., Shleifer and Vishny, 1997; Holderness, 2003). Furthermore, previous studies reveal that ownership concentration is negatively related to disclosure levels. For instance, Fan and Wong (2002) point out that outside investors and analysts have little confidence in the reported earnings in firms with high ownership concentration. Hope

(2003) shows that there is a negative association between ownership concentration and disclosure level. Moreover, Jensen (1986) argues that firms are likely to pay out their free cash flow when they are highly monitored. A model developed by Fluck (1999) demonstrates that increasing the external shareholders' power increases the threat of dismissal of insiders, which encourages managers to pay higher dividends in order not to waste firms' resources on private benefits. Supportively, Faccio et al. (2001) detect that dividend payouts are higher in firms with lower agency conflicts. This in turn suggests that firms may distribute high dividends in the presence of high ownership concentration to mitigate these problems, implying a positive correlation.

Institutional investors can also help to align managerial actions toward shareholder maximization. For instance, Agrawal and Mandelker (1990, 1992) show that firms with high levels of institutional ownership have better corporate monitoring mechanisms. Zeckhauser and Pound (1990) argue that institutional investors could be a substitute for the signalling and the monitoring role of dividends. In contrast, other scholars show that the payment of dividends could be considered as one of the mechanisms that reduce the agency costs between principal and agent in the presence of institutional investors. Eckbo and Verma (1994) find that institutional investors prefer managers to distribute the free cash flow in the form of dividends to mitigate the problems associated with the cost of free cash flow. Likewise, Short et al. (2002) report a positive association between dividends and institutional holdings in the UK. In contrast, Grinstein and Michaely (2005) find no support to the argument that dividend policy is associated with institutional holding. Hence, in the agency framework, dividends and the presence of institutional investors should be positively correlated, as institutional investors force higher dividends.

2.4 Behavioural corporate finance

Behavioural corporate finance relaxes the assumption of standard corporate finance regarding the rationality of agents. The earlier studies in psychology demonstrate that individuals do not always act in a rational manner. Thus, the literature on behavioural corporate finance focuses on the impact of irrational managers on corporate financial decisions. This section reviews the relevant literature.

2.4.1 Human psychological biases

A substantial body of psychological research has shown that people tend to believe that they are better and possess more affirmative elements than the average. For example, Greenwald (1980) argue that, in general, individuals tend to have positive unrealistic beliefs about themselves. Other studies demonstrate that people naturally believe that they are better than the average (Taylor and

Brown, 1988); overestimate their ability (Langer and Roth, 1975; Taylor and Brown, 1988); often expect good things to happen (Weinstein, 1980; Kunda, 1987); overestimate the precision of their information and knowledge (e.g., Fischhoff *et al.*, 1977); attribute good outcomes to their actions and bad outcomes to bad luck (Miller and Ross, 1975). Taken together, the evidence suggests that humans tend to deviate from acting in a rational way.

By taking the psychological biases into consideration, finance scholars investigate the influence of these biases on investors' behaviour as an attempt to explain the anomalies in the financial markets. For example, Daniel *et al.* (1998) theoretically demonstrate that an overconfident investor who overestimates the precision of his private information can cause the stock price to overreact. The theoretical model developed by Odean (1998) examines the effect of overconfident investors on financial markets. They find an increase in the trading volume, volatility and market depth when traders are overconfident. Likewise, Glaser and Weber (2007) show that investors who believe that they possess investment skills better than the average trade excessively. Moreover, Barber and Odean (1999) show that investors trade too frequently without gaining and attribute this phenomena to investors overconfidence. In addition, they detect that investors sell gains quickly and hold losses too long reflecting the disposition effect. In line with the psychological literature that argues that men are more overconfident than women, Barber and Odean (2001) empirically affirm that men trade more excessively than women: they relate this finding to men being more overconfident than women. They also detect a significant negative return among male investors. The earlier work of Barber and Odean (2000) show that traders who trade more often exhibit a greater loss compared with those who trade less.

However, other studies detect that irrational traders can gain abnormal return from their investments compared with their rational peers. DeLong *et al.* (1991) demonstrate that irrational investors underestimate the risk when they have fundamental information, which lead them to take larger long positions in the risky assets. Hence, they take more advantage of the assets' risk premium than their rational counterparts. Kyle and Wang (1997) develop a theoretical model that examines to what extent overconfident traders could survive in the markets where the information is asymmetric. In their model, they show that overconfident investors are more likely to outperform their rational peers and hence survive more in the markets. Hirshleifer and Luo (2001) theoretically show that, in a competitive securities market, overconfident investors who trade more aggressively, based on their private signal, are more likely to exploit risky profit opportunities that are created by either noise traders or liquidity need traders: this leads overconfident traders to earn more profit than their rational counterparts. Likewise, Hirshleifer *et al.* (2006) develop a

theoretical model showing that, even though irrational investors' trading is not driven by the fundamental value of a firm, their trading volumes impact market prices. Thus, in some cases, irrational traders can earn higher abnormal return than rational investors.

The psychological biases that people and investors tend to have could spread among managers which may lead them to take irrational decisions. The literature in behavioural corporate finance studies the effect of managerial psychological biases on corporate financial decisions. Roll (1986) argues that when managers face uncertainty about future outcomes, they are more likely to behave in an irrational way. March and Shapira (1987) show that managers tend to overestimate their ability in controlling projects and underestimate the projects' risks. The literature on the effect of managerial psychological biases on corporate financial decisions is discussed in the following section.

2.4.2 Overconfidence and corporate financial policy

Behavioural corporate finance analyses the effect of managerial psychological biases on corporate finance decisions. Most of this literature focuses on one particular bias: *managerial overconfidence*. The recent works have extensively examined the influence of overconfident CEOs on investment decisions, capital structure and mergers and acquisitions. The next section analyses this literature.

2.4.2.1 Overconfident managers and financing and investment decisions

In the absence of asymmetric information and agency costs, Heaton (2002) develops a theoretical model that examines the effect of managerial optimism (overconfidence) on financing decisions in efficient capital markets. The result demonstrates that an overconfident manager might not take a positive NPV project (*underinvestment*) that has to be externally financed because he believes that the market undervalues his equity and thus the external finance is too costly. He also shows that when a firm has free cash flow, an overconfident manager may invest in a negative NPV project (*overinvestment*) because he overestimates the cash flow from new investments.

Malmendier and Tate (2005a) extend Heaton's (2002) model and empirically examine the effect of managerial overconfidence on the investment decisions of 477 of the largest US firms for the period from 1980 to 1994.⁹ They argue that an overconfident manager invests more when there is a sufficient internal finance to finance new project because they overestimate the project's return, and he abandons new investments when it requires external finance as he believes it is too costly.

⁹ The overconfidence proxies used in the recent literature are discussed in more details in section 2.4.2.4.

Their results reveal that the investment decisions are highly sensitive to free cash flow in firms managed by overconfident managers. Their results were not driven by agency problems or asymmetric information. They made a robust test for that. For example, they find that overconfident CEOs do not earn abnormal return from holding their options compared with the market's return (no asymmetric information). They conclude their study by arguing that stock ownership and stock option are unlikely to mitigate the problem of overconfident managers with the investment decisions. Hence, overconfidence leads manager to be more sensitive to invest firm's free cash flow which might destroy the company's value. Supportively, Malmendier and Tate (2005b) obtain similar results using another measurement of managerial overconfidence based on the perception of outsiders.

In the Taiwanese market, Lin *et al.* (2005) employ another proxy of managerial overconfidence based on managers' earnings forecasts and they investigate the impact of overconfident CEOs on investment decisions in firms that exhibit high financing constraints. Consistent with the earlier studies, they detect high investment-cash flow sensitivity in firms managed by optimistic managers. Likewise, Huang *et al.* (2011) test managerial overconfidence, investment decisions and agency costs in Chinese listed companies from 2002 to 2005. They use earnings forecast and top executives' compensation to measure overconfidence. The results show that overconfident managers are more likely to overinvest in firms with high cash flows, and the sensitivity of investment is greater in firms with high agency costs.

Kamoto (2011) theoretically demonstrates the crucial role of internal funds in influencing the investment decisions made by overconfident managers. His model shows that overconfident manager deviates from optimal investments when he has sufficient or insufficient internal funds to finance new investments.

Interestingly, Campbell *et al.* (2011) use different levels of optimism (high, moderate, low) and empirically find that high (low) optimistic risk-averse CEOs invest more (less) which destroys firms' value. Also, they affirm that those CEOs are more likely to lose their position, particularly, if the board of directors act in the interest of shareholders. Furthermore, CEOs with moderate level of optimism are found to make the best investment decisions that enhance shareholders' value.

Fairchild (2005) develops two theoretical models to investigate the effect of overconfident managers on the financing decision (the choice between debt and equity) in the presence of asymmetric information and moral hazard problems. In Fairchild's model, overconfidence is defined as the manager's overestimation of his ability to affect the desirable outcome of the

company's project. In his first model, asymmetric information is incorporated into Heaton's (2002) model and does not consider the role of free cash flow. His result demonstrates that overconfident managers use more debt and that results in increasing the probability of financial distress. Hence, overconfidence is bad for a firm. Unlike his finding in the asymmetric model, his moral hazard model (similar to Hackbarth, 2002) shows an ambiguous relationship between overconfidence and firm value. That is, the higher level of overconfidence leads manager to exert more effort which is beneficial for shareholders but, at the same time, the overconfident manager takes more debt which is more likely to increase the probability of financial distress. It is suggested by the author that an optimal level of overconfidence exists that would maximise firm's value.

Barros and Silveira (2007) examine the influence of CEO overconfidence on corporate's capital structure in Brazilian listed-firms. They find that firms managed by overconfident managers are more levered compared to those managed by rational peers. More recently, Malmendier *et al.* (2011) study the effect of overconfidence on corporate financing decisions. Their results reveal that managerial overconfidence explains corporate financing policy. Specifically, they find that overconfident managers prefer to use internal funds or riskless debt as a source of finance. Also, they detect that once it comes to choosing between debt and equity to raise funds, overconfident managers prefer debt over equity.

Ben-David *et al.* (2013) survey firms' CFOs to investigate the effect of CFOs overconfidence on corporate financial decisions. They find that an overconfident manager underestimates the volatility of future cash flows, leading him to use lower discount rate; engages more in mergers; invests heavily on capital expenditures; and their firms have high debt and rely more on long term debt. Graham *et al.* (2013) conduct a survey amongst US and non-US firms' CEOs and CFOs and find that firms with optimistic CEOs use more short-term debt.

Furthermore, managerial overconfidence is found to explain merger and acquisitions decisions. Roll (1986) is the first to introduce managerial overconfidence into the context of mergers and acquisitions. Specifically, he uses overconfidence to explain why many takeovers are value destroying. He argues that when manager faces uncertainty about future outcomes, he is more likely to behave in an irrational way. According to his *hubris hypothesis*, overconfident managers overpay for target firms because they believe that their valuation is correct and the markets do not fully reflect firm's value.

Doukas and Petmezas (2007) examine the relationship between managerial overconfidence and mergers conducted by listed firms in the UK for the period from 1980 to 2004. They find that

firms with overconfident managers exhibit positive but lower announcement returns and poorer long-term performance than those with rational counterparts. Malmendier and Tate (2008) examine the impact of overconfident managers on merger decisions on 477 largest US companies from 1980 to 1994. Their findings show that overconfident managers overpay for acquired firms and hence engage in value-destroying mergers. Also, they affirm that firms with overconfident managers suffer from negative stock returns following the announcement of acquisitions.

Likewise, Liu and Taffler (2008) empirically study the correlation between overconfident managers and mergers and acquisitions in the US for the period from 1993-2005. Their study involves over 30,000 CEOs who conduct more than 1,900 mergers and acquisitions. Their results show that overconfident managers are more likely to acquire firms than rational peers and this relation becomes stronger in recent years. Also, they affirm that firms run by overconfident managers exhibit poor short and long run performance post-acquisition compared with those run by rational peers. Further, they detect that effective corporate governance cannot fully mitigate the problem associated with overconfident managers on merger and acquisitions decisions. Likewise, Brown and Sarma (2007) obtain similar results in Australian firms.

In the UK, Croci *et al.* (2010) compare the bidders' performance in high and low markets evaluation between firms run by overconfident and rational managers. Their study involves a sample of over 3000 mergers and acquisitions over the period 1990-2005. Their measure of overconfidence is similar to Malmendier and Tate (2008). They find that rational managers create more value to shareholders through mergers and acquisitions than overconfident managers in all valuation periods. Further, after takeovers, firms with rational managers experience a better long term performance compared to those run by overconfident peers. Following the prior works, Ferris *et al.* (2013) study the extent to which overconfidence can explain international mergers and acquisitions during the period 2000-2006. They find that an examination of overconfident CEOs can explain the number of takeovers, diversifying and non-diversifying acquisitions, and overconfident manager prefers internal funds as a primary financing vehicle.

In summary, most of the existing literature on behaviour corporate finance studies the effect of managerial overconfidence or optimism on financing and investment decisions. Overall, these studies find that overconfident managers; (1) are more likely to increase debt; (2) prefer internal fund over external, and debt over equity (following pecking order theory) and may pass up positive net present value projects if their firms do not have sufficient internal funds to cover firms' investment; (3) investment decisions are very sensitive to the free cash flow; (4) they conduct many mergers and acquisitions; and (5) their M&A decisions have a negative impact on firms'

value and stock price in short and long run. However, there is little work investigating the impact of overconfidence on corporate payout policy, which is discussed in the subsequent section.

2.4.2.2 Managerial overconfidence and payout policy

Recently, emerging research in behavioural corporate finance examines the effect of managerial overconfidence on *payout policy*. Wu and Liu (2008) theoretically examine the impact of managerial overconfidence on corporate dividend policy. Their model is built on Miller and Rock's (1985) dividend policy model assuming that agency problems do not exist and that the CEO's goal is to maximise firm value, with some further relaxation by incorporating some degree of overconfidence in the process of determining firm's future earnings. In their model they define an overconfident manager as the one who overestimates his ability to maintain transitory earnings. They show that overconfident CEOs pay high dividends compared with rational CEOs, as they wrongly assess the permanent and transitory component of earnings. Furthermore, the study demonstrates that in an expanding (down-turning) economy, overconfident managers increase (decrease) the firm's value.

However, the other studies that examine the association between managerial overconfidence and dividend policy reveal opposite results. Ben-David *et al.* (2007) conduct a quarterly survey of Chief Financial Officers (CFOs) in the US, and find that overconfident managers are less likely to pay dividends and more likely to repurchase shares. Cordeiro (2009) argues that overconfident managers always believe their firms to be undervalued by the markets, such managers overestimate the returns from current projects, and/or believe that their firms have good investment opportunities. Therefore, overconfident managers prefer not to pay dividends to shareholders. Using data from the US for the period from 1980 to 1994, Cordeiro finds that firms with overconfident CEOs are less likely to pay dividends compared with those run by rational peers. However, no conclusion is made with regard to the impact of overconfidence on the amount of dividends.

Over the same period, Bouwman (2009) investigates the market's reaction to dividend changes, and the relationship between dividend changes and future earnings in the presence of overconfident and rational managers. She argues that if managers use dividend announcements to convey information about future earnings, investors should react positively to dividend increases. However, if investors can distinguish between overconfident and rational managers then it would be expected that the market will react positively to rational managers' announcements. Her findings reveal that there is a greater abnormal return following the announcement of dividend

increases for optimistic managers compared to rational managers; this has been attributed by the author to the inability of the markets to distinguish between overconfident and rational managers. Moreover, the study detects that whether firms are run by overconfident or rational CEOs, dividend changes have little informational content about future earnings.

More recently, Deshmukh *et al.* (2013) develop a dynamic model of dividend policy and overconfident managers, and empirically test it in the US over the period from 1980 to 1994. Their model builds on the assumptions that overconfidence CEOs view internal funds as less costly than external financing, overestimate the value of future projects and work toward maximising shareholders' value. Their model demonstrates that because overconfident CEOs believe that future investments are value enhancing, they are more likely to lower dividends than rational peers in order to build financial slack to invest in future projects. The model further indicates that the effect of managerial overconfidence on dividends is weaker in high growth firms. Their empirical findings on the effect of managerial overconfidence on the amount of dividends are consistent with their theoretical predictions. More precisely, they affirm that overconfident CEOs pay less dividends than rational counterparts. Also, they show that in high growth firms, the impact of overconfidence on dividend policy is mitigated. However, firms' total payout and share repurchases are found to be unaffected by the types of managers.

Using very recent data between 1992 and 2010, Burg *et al.* (2012) investigate the impact of managerial overconfidence on corporate payout policy (i.e., dividends, share repurchases and total payout) in the US. More specifically, they study the change in the payout policy around CEO turnover by employing a difference-in-difference methodology. They based their predictions on the intuition that since overconfident managers believe their firms to be undervalued and view external finance to be very costly, they are more likely to buy back firms' shares and to pay less dividends compared to rational peers. Their results indicate that incoming overconfident CEOs are more likely to change firms' payout channel. That is, firms with new overconfident managers increase their share repurchases, whereas no effect on share repurchases ratio is found when the new CEOs are rational. Further, they detect an increase in cash dividends among firms with new overconfident managers but this increase is lower than firms with rational managers. For the total payout, they find insignificant differences between rational and overconfident managers.

Shu *et al.* (2012) evaluate the effect of overconfident managers on scale, execution rate and frequency of over 2700 share repurchase programs in Taiwanese listed firms from 2000-2008. They find that firms run by overconfident managers tend to have a higher execution rate and invest more in share repurchases than those run by rational counterparts. Surprisingly, they find that firms

with high market-to-book ratios are managed by overconfident CEOs. This implies that overconfident managers buy back shares not because of undervaluation. Further, they show that there is a negative abnormal return following the announcement of share repurchases programs by overconfident managers.

In the UK, Andriosopoulos *et al.* (2013) study the relationship between information disclosure, managerial overconfidence and buyback completion rate over the period from 1997 to 2006. Their measure of overconfidence is similar to Malmendier *et al.* (2011) which classifies CEOs as overconfident if they keep holding in the money options (at least 40% in the money) at any point until the year of expiration. Their results indicate that information disclosure and overconfidence are positively correlated with buyback completion rate.

A very recent study by Banerjee *et al.* (2014) examines the effect of managerial overconfidence on share repurchases in the US during the period from 1992 to 2011. Their results show that overconfident CEOs are more likely to repurchase shares and invest more on shares repurchases. Further, they find that this relation exacerbates amongst overconfident CEOs who are entrenched. They also detect that overconfident CEOs substitute repurchase for dividends and capital expenditure, and the market reaction to the announcement of share repurchases is less pronounced.

In a developing market, Azouzi and Anis (2012) examine the influence of managerial emotional biases, i.e. loss aversion, optimism and overconfidence, on dividend policy in Tunisian firms. Their study involves 100 executives from both listed and non-listed companies. They find that emotional biases of CEOs negatively affect corporate dividend policy. In another emerging market (Pakistan), Rasheed *et al.* (2012) study the relationship between managerial overconfidence and dividend policy. The results contradict most previous works, showing that overconfident CEOs pay more dividends.¹⁰ In China, Chen *et al.* (2011) investigate the influence of overconfident managers and managerial discretion on dividend policy among 745 listed firms. Consistent with studies in developing markets, they detect a negative association between overconfidence and the amount of dividends. Furthermore, their results show that this relation is strengthened by duality and cash flow and weakened by state ownership and political connection.

2.4.2.3 Is Overconfidence in CEOs always bad?

Numerous empirical studies show that managerial overconfidence may lead to distortions in corporate investment decisions: overconfident CEOs are shown to have higher investment

¹⁰ The small number of observations and the short period it covers restrict the generalisation of this finding to other markets.

sensitivity to free cash flow (e.g., Lin *et al.*, 2005; Malmendier and Tate, 2005a; Huang *et al.*, 2011); engage more in acquisitions and over-pay for target firms (Liu and Taffler, 2008; Malmendier and Tate, 2008; Ferris *et al.*, 2013); are more likely to misreport earnings (Schrand and Zechman, 2012); and are more likely to issue biased earnings forecasts (Hribar and Yang, 2010). Overall, these studies demonstrate that overconfident CEOs are bad for firms.

However, several studies suggest that overconfident CEOs can have positive effects on firms' value. For example, Bernardo and Welch (2001) address theoretically the question of why overconfidence exists. Their model demonstrates that overconfident managers prefer not to imitate their peers and are more likely to explore their environment better than rational managers.

Fairchild (2009) develops a model of managerial overconfidence, moral hazard and excessive life-cycle debt sensitivity. He demonstrates that overconfidence leads managers to exert more effort and hence increase firm's value. Gervais *et al.* (2011) show that risk averse overconfident CEOs hesitate less before taking risky projects, exert more effort and enhance shareholders' value. The model of Goel and Thakor (2008) reveals that moderate overconfidence encourages risk averse CEOs to pursuing risky projects and mitigating the under-investment problems, hence, increasing firm value. Campbell *et al.* (2011) find empirical evidence for Goel and Thakor's (2008) model. More specifically, Campbell *et al.* (2011) show that a moderate level of overconfidence leads managers to choose the best investment level that maximise firms' value.

Galasso and Simcoe (2011) detect that firms with overconfident CEOs are better than those with rational peers in terms of investing in innovation and taking their firms into new technological directions. Likewise, in the recent study of Hirshleifer *et al.* (2012), they empirically investigate the benefits of having overconfident CEOs in the US between 1993-2003. They find that overconfident managers take risky projects, invest heavily in innovation, obtain more patents and patent citations and achieve greater innovation success.

2.4.2.4 Managerial Overconfidence proxies

Since overconfidence is an unobservable characteristic, researchers have employed different measurements of managerial overconfidence. Those proxies can roughly be classified based on four categories: CEOs options, press releases, surveys of top executives, and earnings forecasts.

A large amount of studies use the exercise of managerial vested stock options in their own firms to capture their belief about their companies. For example, the "Longholder", an overconfidence proxy, is based on the timing of option exercise by CEOs and is employed in many recent studies (e.g., Malmendier and Tate 2005a, 2008; Croci *et al.*, 2010; Campbell *et al.*, 2011; Hirshleifer *et*

al. 2012; Ahmed and Duellman 2013; Banerjee *et al.*, 2014). The Longholder measure of overconfidence is proposed by Malmendier and Tate (2008) which is defined as a dummy variable that is equal to 1 if the CEO at least once during his tenure hold an option (at least 40% in the money) until the last year. Since the CEO is exposed to firm specific risk and his human capital is linked to firm's performance, he should diversify his wealth by cashing options and investing elsewhere. However, if the CEO fails to exercise in the money options, this provides an indication that he is overconfident about the future value of his company.

The press release measure is based on outside perception (newspapers) about CEOs actions, behaviour and attitude which has been adopted in the recent works of Malmendier and Tate (2005b), Jin and Kothari (2008), Hirshleifer *et al.* (2012) and Banerjee *et al.* (2014). This proxy is constructed through collecting data from the press on each CEO during a sample period. CEOs are classified as overconfident if the number of articles that refer to the CEO as confident, confidence, optimistic and optimism are greater than those that refer to the CEO as not confident, not optimistic, reliable, cautious, conservative, practical, frugal and steady.

The survey-based approach has been used by Ben-David *et al.* (2007, 2013) where they classify CFOs as overconfident based on their miscalibration of stock market forecast. Oliver (2005) uses the University of Michigan Consumer Sentiment Index to proxy managerial overconfidence. Other studies such as Lin *et al.* (2005), Li and Tang (2010) and Huang *et al.* (2011) capture managerial overconfidence through earnings forecasts.

A study of Barros and Silveira (2007) classify manager as overconfident based on whether a manager is an entrepreneur or not. Doukas and Petmezas (2007) and Billett and Qian (2008) identify a manager as overconfident when he conducts five or more acquisitions in a short span. CEOs net purchases of their firms' stock is also used to proxy overconfidence (Malmendier and Tate, 2005a; Campbell *et al.*, 2011).

Although different proxies of managerial overconfidence are developed in the corporate finance literature, the option-based measure seems to dominate other measures. Most of the previous studies in the UK adopt this measure in testing the effect of managerial overconfidence on corporate financial policy (e.g., Croci *et al.*, 2010; Andriosopoulos *et al.*, 2013). This is the approach that I adopt in this thesis.

Chapter 3: Do dividends provide information about earnings? Evidence from Oman¹¹

3.1 Introduction

Miller and Modigliani's (1961) famous dividend irrelevance theorem stated that, under perfect market conditions, firm value is unaffected by a firm's dividend policy. Starting from the observation that, in practice, investors tend to react positively to corporate announcements of dividend increases, there has been much theoretical and empirical work attempting to understand the relationship between dividends, corporate performance, and stock prices. Two major assumptions driving the MM irrelevance theorem were that a) a firm's management is purely interested in maximising shareholder value (no agency problems) and b) corporate insiders and outsiders share the same information about the firm's operations and prospects (the 'symmetric information' assumption). Subsequent theoretical research has paved the way for two competing explanations of the positive effects of dividends on firm value: a) the free cash-flow hypothesis (related to models of agency problems), and the signalling hypothesis (related to models of asymmetric information).¹²

Under the signalling hypothesis, it is argued that dividend increases contain positive informational content about future earnings. Thus, dividends and earnings should be positively correlated. Furthermore, following an announcement of a dividend increase, current share prices should immediately move upwards. Under the free cash flow hypothesis, it is argued that dividend increases reduce managerial incentive problems by reducing the free cash flow available for managers to waste on value-reducing activities. Therefore, as with the signalling hypothesis, dividends, earnings, and share price movements should be positively correlated.

Empirical tests of these hypotheses tend to focus on two factors: a) the effect of dividends on stock prices (that is, market reaction to dividends), and b) the relationship between dividends and earnings. The empirical analysis in the US, and other developed markets, suggests that dividend changes are positively associated with stock price adjustment in the same direction (e.g., Pettit, 1972; Aharony and Swary, 1980; Kane *et al.*, 1984; Nissim and Ziv, 2001; Gunasekarage and Power, 2002; Harada and Nguyen, 2005; Lie, 2005; Dasilas and Leventis, 2011), supporting the

¹¹ I would like to thank seminar participants at the University of Bath, 2014; and the British Accounting and Finance Association (BAFA) Conference participants at the University of Cardiff, for their helpful comments and suggestions. Special thanks also go to Ahmed M. Meqibel (Deputy DG) and Munadhil H. Al- Ghafri (Data specialist) from the Muscat Security Market for providing the data. Any errors are our own.

¹² In addition to the signalling and free cash flow hypotheses, there is emerging research in other theoretical directions, such as the lifecycle theory, and behavioural and cultural approaches. We briefly consider this literature in section 3.2.3.

signalling hypothesis. However, when considering the relationship between dividend changes and future *earnings*, the evidence is mixed. Much of the recent work in this area rejects the dividend signalling hypothesis (e.g., Benartzi *et al.*, 1997; Grullon *et al.*, 2005).

Aggarwal *et al.* (2012) argue that the inconclusive results on the relationship between dividends and future earnings in the previous studies might occur due to the variation in asymmetric information among public firms, which insufficiently provides adequate testing power in the US. They use a sample of foreign firms that cross-list on the US stock market in the form of American Depository Receipts (ADRs) which represents firms with poor information environment. Their results reveal a strong association between dividend increases and future earnings among those firms, which is in line with the signalling hypothesis.

While most of these studies have been conducted in the US (e.g., Aharony and Swary, 1980; Nissim and Ziv, 2001) and other developed markets (e.g., Harada and Nguyen, 2005; Dasilas and Leventis, 2011), much less consideration has been given to developing markets where financial and institutional characteristics differ significantly. In this paper, we address this gap by examining the relationship between dividend changes and past, current, and future earnings in firms listed in the Muscat Securities Market (MSM). We employ various methods of estimating unexpected earnings, based on the works of Benartzi *et al.* (1997), Nissim and Ziv (2001) and Grullon *et al.* (2005).

The unique institutional background in Oman provides us with an opportunity to investigate the information content of dividend changes, and the factors that drive the change in dividends. Specifically, in Oman there is no tax on dividends and capital gains (Al-Yahyaee *et al.*, 2011) which allows us to re-test the tax based signalling hypothesis (Black, 1976).¹³ A signal has to be costly to be of any value. According to this hypothesis, in the absence of tax, dividends are not a credible signal with respect to firm prospects in the Omani market. Moreover, firms in Oman change their dividends frequently (see Table 3.1), suggesting that dividend changes lose their reliability as a signal of a firm's future prospects (Chen *et al.*, 2002). Furthermore, Omani firms depend heavily on bank financing and have a high ownership concentration (Al-Yahyaee *et al.*, 2011). This suggests that the cash flow problems regarding overinvestment, and the conflict of interest between managers and shareholders would be mitigated. Thus, there should be little role

¹³ The Omani government depends heavily on oil and gas revenue which accounts for over 60% of total export earnings, 45% of government revenue and 50% of GDP government revenue. It has a very low inflation rate, no personal tax and flat corporate tax of 12 %. Its currency, Omani Riyal, has been pegged to the US dollar since 1986 (1 Omani Riyal = \$2.6).

for the free cash flow hypothesis, and dividend changes should have weak correlation with future earnings changes.

On the other hand, Omani firms may use dividend changes as a signal of the firms' future profitability for many reasons. In contrast to the U.S. market, Oman has low corporate disclosure requirements and low transparency (Islam, 2003), unpublished earnings forecasts and very few professional analysts (Al-Yahyaee *et al.*, 2011). These features suggest a poor information environment in Oman which might provide an incentive for firms to use dividends to convey information about the earnings quality of a firm (Skinner and Soltes, 2011; Aggarwal *et al.*, 2012). Our analysis of the relationship between dividends and profitability in Oman complements a recent study by Al-Yahyaee *et al.* (2011). These authors examine the link between dividends and *stock prices* in Oman. They test the signalling theory by analysing the effect of dividend increases on stock price movements (that is, investors' reactions to dividend announcements). They find a positive relationship between dividend announcements and stock prices, in support of the signalling theory. In contrast, we test the signalling hypothesis by analysing the relationship between dividend announcements and past, current and future profitability. Besides Al-Yahyaee *et al.* (2011), we are aware of one other published study that examines dividend policy in Oman. Al-Yahyaee *et al.* (2010) estimate the Lintner model for the period 1989-2004 and conclude that Omani firms follow a dividend-smoothing policy.

Our results are consistent with earlier studies in the U.S. documenting that dividend changes are not correlated with future profitability changes. Using matched-sample approaches, we find that dividend changes are highly correlated with past and current profitability changes. In testing the signalling hypothesis, our results reveal that current changes in dividends are associated with future adjusted profitability changes in year two only for the case of dividend decreases and omissions. However, this relationship holds for one measure of profitability only. Further, the linear model provides little support for the information content of dividends for the case of dividend decreases. More importantly, after controlling for the nonlinearity in the earnings pattern, we find no evidence of a correlation between dividend changes and future profitability changes. These findings suggest that the unique market characteristics of Oman (no tax on dividends, high share ownership concentration, heavy reliance on bank financing, and frequent dividend policy changes), lead to a diminished role for the dividend signalling hypothesis in this environment. However, our results show a strong association between dividend changes and changes in *current* profitability. Furthermore, the results provide no support to the argument suggested by Aggarwal *et al.* (2012) that firms in a poor information environment have more incentive to use dividend increases to signal their future prospect.

In addition to examining the association between dividend changes and future profitability changes, we investigate *the factors* that lead to dividend changes in the Omani market. Not surprisingly, the results show that current and past profitability changes are positively associated with dividend changes, increases and decreases in Omani firms.

The results also reveal that leverage (dividend yield) is positively (negatively) correlated with the amount of dividend changes and increases. Furthermore, our findings show that market to book ratio, firm age, and current and past change in retained earnings are insignificantly associated with the magnitude of dividend changes and increases in Oman. For dividend-decreasing firms, we observe that all control variables are insignificantly associated with the amount of dividend decreases, except current changes in retained earnings. These results stand in a sharp contrast to the life cycle theory (Grullon and Michaely, 2002; DeAngelo and DeAngelo, 2006).

Our investigation of the factors that influence the likelihood of firms to change (increase or decrease) dividends in Oman reveals the following. We find that current and past profitability affects the propensity of firms to change dividends. Furthermore, the propensity of firms to increase dividends is positively related to firm size and negatively related to leverage, dividend yield and current change in retained earnings. Current investment reduces the propensity of Omani firms to decrease dividends while market to book ratio, dividend yield and firm age increase this propensity.

Our study provides several contributions to the literature. Firstly, we provide evidence on the tax-based signalling model (Black, 1976). We show that, in a market where dividends are not tax-disadvantaged relative to capital gains, there is no evidence of the signalling hypothesis (in relation to future earnings): this is consistent with Kuo (2013) who finds a significant (insignificant) relationship between taxable (untaxable) stock dividends and future earnings in Taiwan. The second contribution is related to the information content of dividend in a poor information environment. We show that, even though Oman has a poor information environment, which is more likely to encourage firms to use dividends to signal their future prospect (Aggarwal *et al.*, 2012), there is no evidence of the signalling hypothesis in terms of Omani firms employing dividends to signal future earnings. This sheds light on the difference in corporate dividend policy between developed and developing countries. Thirdly, our work complements Al-Yahyaee et al (2011), who, similar to us, test the tax-based dividend signalling hypothesis in Oman, but they focus on the signalling effects of dividend changes on stock prices in the Omani market. Interestingly, they find a positive relationship between dividend changes and stock prices, which provides support for the signalling hypothesis. In contrast, we find no evidence of any significant link between dividend changes and future earnings, being in conflict with the dividend signalling

hypothesis.¹⁴ Finally, our conclusion about the strong relationship between dividend changes and current profitability changes enable us to understand why firms in Oman frequently change their dividends. Therefore, our study provides practical applications for managers, investors as well as practitioners with regard to the announcement of dividend changes in Omani market.

The remainder of this chapter is organized as follows. Section 3.2 discusses the theoretical and empirical studies related to this paper. In section 3.3, we develop our hypotheses. Section 3.4 describes the sample and provides descriptive statistics. Section 3.5 presents the empirical findings. Section 3.6 concludes the paper.

3.2 Theoretical and empirical studies

Following Miller and Modigliani's (1961) dividend irrelevance theorem, much theoretical work has been conducted in order to understand the rationale behind corporate dividend policy, and, in particular, the evidence that the stock market reacts positively to dividend increases. Much of this work focuses on two main hypotheses; a) that dividends provide positive signals about firms to the market in the face of asymmetric information between managers and investors (the signalling hypothesis), and b) that dividends alleviate agency problems by reducing the free cash flow available to self-interested managers (the free cash flow hypothesis). Recently, additional theories have also been developed to explain the variation of dividends across firms, such as the life cycle theory.¹⁵

3.2.1 The signalling theory

The signalling theory of dividends suggests that a firm's dividends are used to convey information about the firm's future prospects, and tax on dividends makes the signal more informative (Bhattacharya, 1979; John and Williams, 1985). There are an increasing number of empirical studies examining the relationship between dividend changes and earnings. This is an interesting area of research, as existing studies (e.g., Allen and Michaely (2003), among others) reveal mixed conclusions.

Dividend changes are found to have no information content about future earnings changes in many empirical studies (e.g., Watts, 1973; Gonedes, 1978; Benartzi *et al.*, 1997; DeAngelo *et al.*, 1996).

¹⁴ We identify this as an interesting, and under-researched, area of scholarly enquiry into dividend signalling: existing studies tend to support the dividend signalling hypothesis when considering the relationship between dividend announcements and stock price reactions. However, in contrast, the signalling hypothesis is largely unsupported when considering the evidence on the relationship between dividends and future earnings. In our conclusion, we discuss this further as an exciting area for future research.

¹⁵ For a comprehensive review of the relevant literature see section 2.1.3.

On the other hand, the earlier works of Nissim and Ziv (2001), Chen and Wu (1999), and Harada and Nguyen (2005) provide evidence of the signalling theory of dividends.

Grullon *et al.* (2005) state that the mixed evidence revealed in previous studies may be attributed to the different methods that have been used to estimate the expected earnings. After controlling for the nonlinearity of earnings expectations, Grullon *et al.* (2005) document that dividend changes are not correlated with future earnings changes.

A recent study by Aggarwal *et al.* (2012) argues that the inconclusive findings in the previous literature on the relationship between dividend changes and future earnings might be attributed to the information environment. Their study show that firms existing in a poor information environment (i.e., high asymmetric information) use dividends to signal their future prospects.

3.2.2 The agency theory

Corporate dividend policy can play a crucial role in aligning the interests of managers to those of shareholders. Managers distribute dividends to commit not to use firms' free cash flows in private benefits and to eliminate the overinvestment problem (Jensen, 1986; Lang and Litzenberger, 1989; Gugler and Yurtoglu, 2003). Furthermore, paying large dividends forces managers to seek external finance for new projects, which imposes further monitoring by the capital market (Easterbrook, 1984).

In the presence of high ownership concentrations, that sufficiently monitor manager's actions, dividends may not be an appropriate device to mitigate the agency problems (Bartram *et al.*, 2012). However, this evidence is contradicted by the earlier studies of Fluck (1999) and Faccio *et al.* (2001) which show that firms with large outside shareholders pay more dividends.

Leverage is another mechanism that may align managers' interests to those of shareholder and hence could be viewed as a substitute for dividends (e.g., Jensen, 1986; Margaritis and Psillaki, 2010).

3.2.3 The life cycle

The life cycle theory presents another explanation of the variations in dividend policy between firms. Empirical studies show that, in the early stages, firms tend to pay a low level of dividends, as they need to retain cash for growth and investment opportunities. However, as they approach maturity, the opposite tendency is found. That is, they are more likely to pay dividends (Fama and French, 2001; Grullon and Michaely, 2002; DeAngelo and DeAngelo, 2006; Denis and Osobov, 2008).

3.3 Hypothesis development

In Oman, neither dividends nor capital gains are taxed. As suggested by Al-Yahyaee et al (2011), this provides an interesting setting in which to examine the tax based signalling hypothesis, as developed by Bhattacharya (1979), and John and Williams (1985). Since dividends are not taxed in Oman, we would expect that dividend changes might be less informative about future earnings, compared with those in countries where dividends are taxed more heavily than capital gains. In contrast, if we find a strong association between dividend changes and future earnings in Oman, this would suggest a diminishing role for tax in explanation the signalling hypothesis of dividends changes.

Moreover, the majority of Omani firms are characterised by having a high ownership concentration and are highly leveraged (Al-Yahyaee, 2006). These features suggest a diminished role for dividends in eliminating the agency conflict between the principal and the shareholder. Therefore, the features of Omani market (no tax on dividends and capital gains, high ownership concentration and high leverage) suggest that dividends changes in Oman would be expected to have no or weak information content about firms' future prospects.

Moreover, Al-Yahyaee *et al.* (2011) find a high propensity for Omani firms to change dividends very frequently (that is, every year). This tendency is similar to that reported by Choi et al. (2011) using Korean data. However, it conflicts with the pattern observed in the US and other developed markets, where firms are less likely to change their dividend levels (e.g., Benartzi *et al.*, 1997; Nissim and Ziv, 2001; Grullon *et al.*, 2005; Andres *et al.*, 2009). This frequent change of dividends in Oman may weaken the signalling properties of dividends, and their relationship with future profitability. The discussion leads to the following two conflicting hypotheses:

Hypothesis 3.1: Dividend changes are likely to have no or weak information content about firms' future profitability in Oman.

Hypothesis 3.1 arises from the lack of tax on dividends, and the institutional environment in Oman. In contrast to hypothesis 3.1, there is an argument that the Omani corporate environment may lead to *stronger* incentives to use dividends as a signalling device. Survey evidence of Brav *et al.* (2005) reveals that executives in the US do not use dividend as a signalling device when they could convey firms' information to shareholders through alternative less costly channels. Unlike in the US and other developed markets, Oman has low corporate disclosure requirements and low transparency (Islam, 2003), unpublished earnings forecasting and very few professional analysts (Al-Yahyaee *et al.*, 2011). This would suggest a poor information environment in the Omani market. Aggarwal *et al.* (2012) affirm that firms that exhibit a high degree of asymmetric information (i.e. poor information environment) are more likely to use dividends to signal their

future profitability. Furthermore, high ownership concentration in Oman may lead firms to pay high dividends (Jensen, 1986; Faccio *et al.*, 2001). We formalize this prediction in the following hypothesis:

Hypothesis 3.2: Dividend changes are likely to have information content about firms' future profitability in Oman.

The conflicting predictions in hypotheses 3.1 and 3.2 make the Omani market an interesting environment for studying the relationship between dividends and earnings.

3.4 Data

Our sample consists of Omani non-financial firms announcing cash dividends between the years 2000 and 2011. Cash dividends, stock dividends and stock splits are gathered from the Muscat Securities Market (MSM) website. The data for all other factors (e.g., earnings, market value and book value of equity, total assets and retained earnings) are collected from the "Shareholding Guide of MSM Listed Companies" and "Key Indicators of Public Joint Stock Companies Report"¹⁶. Our sample consists of all regular cash dividends (thus excluding stock dividends, stock repurchases, stock splits and extra dividends). Our original sample contained 1420 dividend changes and non-dividend changes. After imposing the above constraints on the dividend and the fiscal year, the resulting sample consists of 599 dividend changes (dividend increases and decreases) and 152 non-dividend changes. Table 3.1 provides a list of the variables that we consider in this study, together with the acronyms used throughout the paper.

Table 3.2 Panel A summarizes the distribution of firms with dividend increases, dividend decreases, dividend initiations, dividend omissions, and no-change in dividends by year. An important stylized fact, reported by Al-Yahyaee *et al.* (2011), is the high propensity for Omani firms to change dividends very frequently (that is, every year). As reported in Table 3.2, approximately 83% of Omani companies change their dividend level every year. This tendency is similar to that reported by Choi *et al.* (2011) using Korean data. However, it conflicts with the pattern observed in the US and other developed markets, where firms are less likely to change their dividend levels (e.g., Benartzi *et al.*, 1997; Nissim and Ziv, 2001; Grullon *et al.*, 2005; Andres *et al.*, 2009). Comparing the frequency of dividend increases and decreases by the Omani firms in our sample, dividend increases (decreases) account for about 46% (31%), whereas in the US market they account for nearly 94% (6%) of the dividend changes (Nissim and Ziv, 2001).

¹⁶ This report can be obtained from the Muscat Security Market (MSM) web site (www.msm.gov.om). It was first published in 2009, and it covered a 10 year period for all listed firms in MSM from 2000-2009. The second report was released in 2011: it covers the period from 2002 to 2011. Since 2011, no report has been published yet.

Another marked difference is that the number of Omani firms that initiate their dividends is higher than those that omit their dividends.

Table 3.1. The list of the variables and their definitions

Name	Definitions
DIVCHG	The percentage change in annual dividend payments
Size	Natural logarithm of total assets
M/B	Market value of equity scaled by book value of equity
Growth	Growth in total assets
LEV	Leverage measured as total debt scaled by book value of total assets
YLD	Dividend yield is calculated as dividends in previous year divided by market value of equity at the beginning of previous year
Age	Firm maturity is measured as the logarithm of firm age since inception
ERN	Earnings scaled by total assets
RE/BE	Retained earnings over book value of equity
RETACH	Change in retained earnings
ROE	Return on equity calculated as net income scaled by book value of equity
ROA	Return on assets measured as operating income divided by total assets
ECHG	Change in ERN
EDBV	Change in earnings scaled by book value of equity
EDMV	Change in earnings scaled by market value of equity
ROACHG	Change in return on assets (ROA)
ROECHG	Change in return on equity (ROE)

This stands in sharp contrast to the evidence on US firms where firms that omit are more than those initiate dividends (e.g., Michaely *et al.*, 1995; Ho and Wu, 2001). Panel B reports the trends in dividend payout policy of Omani firms from 2001 to 2011. It shows that Omani firms distribute a large proportion of their earnings as dividends: on average, these firms distribute over 55% of their earnings as dividends.

Table 3.3 presents the descriptive statistics for each dividend group; increases (Panel A), decreases (Panel B), no change (Panel C), initiations (Panel D) and omissions (Panel E). The average (median) increase in dividends is about 83% (40%) compared with an average (median) decrease in dividends of approximately 34% (33%). These findings are in line with Choi *et al.* (2011), who show that dividend increases in Korea are more extreme in magnitude than dividend decreases. However, this finding contrasts with the previous studies in the U.S. (e.g., Nissim and Ziv, 2001; Grullon *et al.*, 2005), which show that dividend increases are less extreme in magnitude. In our analysis, firms that increase dividends have more profit, market to book ratio and growth. Dividend decreasing firms are larger, have a higher leverage ratio, are more mature and have a

higher dividend yield. Firms that omit dividends have negative profitability and very low growth. Firms that initiate dividends are more profitable than dividend-omitting firms.

Table 3.2. Frequency of firm-year observations and Cash dividends distributions

Panel A. Frequency of firm-year observations

Year	Dividend Increases	Dividend Decreases	No Change	Dividend Initiation	Dividend Omission	Total for year
2001	18	14	10	8	2	52
2002	28	15	14	14	4	75
2003	27	16	14	6	5	68
2004	35	17	16	10	2	80
2005	35	22	19	9	7	92
2006	47	20	15	7	3	92
2007	54	14	14	12	6	100
2008	13	40	11	6	21	91
2009	23	38	19	12	9	101
2010	39	22	9	12	5	87
2011	37	25	11	5	9	87
Total for category	356	243	152	101	73	925

Panel B. Cash dividends distributions

Year	$\Sigma_i Div$	$\Sigma_i Earnings$	$\frac{\Sigma_i Div}{\Sigma_i Earnings} (\%)$	No. of firms pay Div	No. of firm not paying Div
2001	63.5	115.5	55	50	45
2002	76.2	124.6	61	71	40
2003	90.8	101.6	89	63	35
2004	101.7	206.9	49	78	36
2005	138	282	49	85	34
2006	217.4	423.4	51	89	34
2007	314	654.5	50	94	28
2008	265.3	492	54	70	46
2009	268.8	542.8	50	92	28
2010	305.5	610.2	50	82	40
2011	309.9	579.2	54	78	43

Notes. Panel A shows the number of firm-year observation for each year of the sample for No Change (in dividends), Dividend Increases, Dividend Decreases, Dividend Initiation and Dividend Omission. The sample consists of 599 dividend changes and 152 no dividend changes. Dividend increases (decreases) is defined as the event that firms pay more (less) cash dividend than the previous year. Dividend Initiation is defined as the event that firms pay cash dividend a hiatus of one year. Dividend Omission is defined as the event that firms cut cash dividend for the first time after paying them for at least one year and the firms that chose not to change dividends is defined as No Change. Panel B table reports the annual cash dividends for a sample of Omani firms from 2001-2011. Div is the total amount of cash dividends; Earnings is the earnings after tax. Σ_i represents the aggregation of data by calendar year (in Millions of Omani Rials).

Table 3.3. Descriptive statistics

	N	Mean	Median	Min	Max	Std. Dev.
<i>Panel A: Dividend increases</i>						
DIVCHG	356	0.835	0.400	0.040	36.067	2.667
Size	356	9.938	9.930	6.753	13.099	1.232
M/B	356	1.972	1.650	0.209	8.789	1.349
Growth	356	0.155	0.110	-0.272	2.583	0.286
LEV	356	0.412	0.410	0.053	0.976	0.215
YLD	356	0.068	0.060	0.007	0.431	0.043
Age	356	2.762	2.710	0.693	3.689	0.540
ERN	356	0.11	0.11	0.01	0.31	0.06
RETA	356	0.068	0.060	-0.217	0.414	0.077
ROE	356	0.197	0.180	0.021	0.784	0.107
ROA	356	0.109	0.110	0.009	0.312	0.057
<i>Panel B: Dividend decreases</i>						
DIVCHG	243	-0.338	-0.330	-0.778	-0.050	0.176
Size	243	10.158	10.150	8.006	13.027	1.268
M/B	243	1.856	1.520	0.377	17.165	1.977
Growth	243	0.127	0.010	-0.216	5.714	0.618
LEV	243	0.457	0.460	0.044	0.985	0.232
YLD	243	0.129	0.080	0.013	1.316	0.195
Age	243	2.849	2.860	1.792	3.638	0.515
ERN	243	0.072	0.060	-0.059	0.221	0.049
RETA	243	0.038	0.020	-0.293	0.283	0.077
ROE	243	0.153	0.130	-0.238	0.923	0.135
ROA	243	0.072	0.060	-0.059	0.221	0.049
<i>Panel C: No change in dividends</i>						
DIVCHG	152	0	0	0	0	0
Size	152	9.991	9.950	6.742	13.472	1.518
M/B	152	1.700	1.710	0.208	4.425	0.880
Growth	152	0.075	0.060	-0.178	0.553	0.133
LEV	152	0.411	0.410	0.089	0.812	0.205
YLD	152	0.093	0.070	0.012	0.829	0.125
Age	152	2.680	2.640	1.386	3.584	0.527
ERN	152	0.100	0.090	0.010	0.330	0.060
RETA	152	0.061	0.050	-0.042	0.216	0.063
ROE	152	0.173	0.146	0.025	0.470	0.088
ROA	152	0.101	0.090	0.014	0.330	0.063
<i>Panel D: Dividend initiations</i>						
DIVCHG	101	1	1	1	1	0
Size	101	9.587	9.580	6.621	12.741	1.462
M/B	101	1.849	1.180	0.000	21.476	2.968
Growth	101	0.130	9.000	-0.150	0.646	0.177
LEV	101	0.448	0.470	0.054	0.990	0.252
YLD	101	0.000	0.000	0.000	0.000	0.000
Age	101	2.524	2.560	0.000	3.497	0.657
ERN	101	0.090	0.060	-0.050	0.300	0.070
RETA	101	0.054	0.050	-0.849	0.651	0.177
ROE	101	0.200	0.160	-0.139	1.127	0.199
ROA	101	0.089	0.060	-0.051	0.298	0.071
<i>Panel E: Dividend omissions</i>						
DIVCHG	73	-1	-1	-1	-1	0
Size	73	9.246	9.140	6.522	13.390	1.533
M/B	73	1.490	1.230	0.230	4.716	1.080
Growth	73	0.033	-0.020	-0.394	1.110	0.272
LEV	73	0.457	0.480	0.049	0.931	0.251
YLD	73	0.082	0.060	0.011	0.459	0.081
Age	73	2.843	2.920	1.792	3.526	0.478
ERN	73	-0.010	0.000	-0.480	0.200	0.110
RETA	73	-0.061	-0.020	-0.910	0.235	0.198
ROE	73	-0.009	0.010	-0.910	0.326	0.209
ROA	73	-0.007	0.000	-0.476	0.202	0.105

Note. The table presents several characteristics of the sample of Omani firms. It reports the mean, median, maximum, minimum and standard deviation of variables for each dividend's category. All variables are defined in Table 3.1. Panels A, B, C, D and E present the groups of firms that chose to increase, decrease, not change, initiate or omit dividends, respectively.

3.5 Estimation Methods

The hypotheses developed in section 3.3 are tested using different estimation methods including pooled OLS with robust standard errors, the Fama-MacBeth (1973) method and the fixed effects with panel data approach.

3.5.1 Ordinary Least Square (OLS) Regression

The analysis begins by estimating a sample linear regression: the pooled OLS regression. The OLS regression is the common form of a linear regression that applies an ordinary least squares approach to predict the variance of the dependent variable (i.e., continuous variable) from linear combinations of independent variables (Dougherty, 2007, p 43). This approach will enable us to verify our results with similar earlier works in the US (e.g., Benartzi et al., 1997; Nissim and Ziv 2001). Although this type of regression does not exclude any observations from the analysis and is the easiest to run, researchers need to overcome the common problems associated with using this method: autocorrelation outliers, multicollinearity and heteroscedasticity.

An outlier is an observation that is very different from the rest of the sample. On the one hand the inclusion of this observation in the regression produces misleading results. On the other hand, the exclusion of outliers from the sample reduces the sample size. Winsorisation is a statistical technique aiming to reduce the impact of outliers in the sample. This process can be performed in two ways: trimming the sample which involves removing a certain percentage of values in one or both sides of the distribution, or redefining the most extreme values in the tail(s) of the distribution to the closest extreme values (Yale and Forsythe, 1976). The latter technique is used in this study to avoid eliminating data from the sample. Specifically, a one percent Winsorisation is used (from both side of tails) on all variables.

Multicollinearity is another problem that leads to bias in the estimated output of the OLS regression. It occurs when one or more of the independent variables are highly correlated which leads to a number of problems in understanding the significance of the individual predictor variables in the regression model. Researchers use a variance inflation factor (VIF) to quantify the severity of multicollinearity in OLS analysis. The VIF of a variable must not exceed 10, as a rule of thumb, in order to conclude that multicollinearity does not affect the regression outputs. In this current study the VIF of predictors are calculated in all models and reveal that the highest value of VIF is about 2.16, indicating that multicollinearity is not a major problem in our study.

Heteroscedasticity occurs when the error term does not have a constant variance. The presence of heteroskedasticity causes the estimator to be inefficient. White (1980) developed a test to detect the association between the variance of the error term and the predictors. All OLS regressions

carried out in this study are estimated with heteroscedasticity-robust Whites' (1980) standard errors (t-statistics).

3.5.2 Fama-MacBeth (1973)

This study also uses the Fama and MacBeth (1973) method to investigate the relationship between dividend changes and future profitability, similar to the earlier works of Nissim and Ziv (2001) and Grullon et al. (2005). This approach accounts for heteroscedasticity and autocorrelation in the regression residual: reducing the problems associated with residual cross-sectional regression analysis.

The Fama and MacBeth (1973) procedure is performed in two steps: the first step is to estimate cross-sectional regression coefficients for all observations in each year; the second step is to compute time-series means of the cross-sectional regression coefficients. The autocorrelation in the residual over time is corrected via the inclusion lag of dependent and independent variables in the cross-sectional regression.¹⁷

The reported regression coefficients in this study are the time-series averages of each year's cross-sectional regression coefficients.¹⁸ The Hansen and Hodrick (1980) error correction method is used to estimate the standard deviations for these averages.

3.5.3 Fixed/Random effects

In addition to the above estimation methods, panel data datasets that combine time series and cross sections are employed in this chapter as a robustness check on the relationship between dividend changes and current and future profitability on Omani listed firms.

There are several advantages to using panel datasets, discussed in the econometric literature (e.g. Baltagi, 2005; Hsiao, 2003). The panel data accounts for the individual heterogeneity in both the cross section and time series: controlling for unobserved variables and variables that change over time but not across firms. Also it reduces collinearity among variables. In a panel data setting, there are two model specifications that can be used: Fixed or random effects. A Hausman test is used to decide between these two models and determine which is preferred. The result of this test reveals that errors are correlated with some of the independent variables.

Therefore, a fixed effects approach using panel data with clustering at the firm level is employed, which tackles the unobserved heterogeneity bias. In this study, it explains the variation about the mean of the dependent variable (i.e., current and future earnings) in terms of the variations about

¹⁷ See Nissim and Ziv (2001) and Grullon et al (2005) for more details.

¹⁸ STATA 13 runs this test automatically using the code: xtfrm.

the mean of the predictors' variables for the group of observations relating to a given firm (e.g., dividend changes).

3.6 Empirical results

3.6.1 Unadjusted/adjusted profitability changes around dividend changes

We begin our analysis by examining the profitability performance surrounding dividend changes, following the earlier studies (e.g., Benartzi *et al.*, 1997; Fukuda, 2000; Fairchild *et al.*, 2014). We accomplish this by calculating the mean of unadjusted profitability changes for year -2, -1, 0, 1 and 2 (year 0 is the announcement year) for each dividend category. Then we replicate the same analysis using the mean of adjusted profitability changes, defined as the difference between the mean of profitability changes for dividend changes and non-dividend changes in the same industry. If the profitability follows a random walk, then the mean of profitability changes should be equal to zero. Table 3.4 reports the findings under two different panels. Panel A displays the mean of unadjusted profitability changes. Panel B shows the mean of adjusted profitability performance of dividend changing firms compared with firms that did not change their dividends in the same industry.

3.6.1.1 Unadjusted profitability

Table 3.4, Panel A, shows that dividend increasing firms have significant and positive profitability changes in years -1 and 0. These findings suggest that there is a strong association between dividend increases and past and current profitability changes for all profitability measures. This trend continues to hold in year 1 for the *EDMV* measure (see Table 3.1 for variable definitions), and in year 2 for the *EDBV* measure, indicating a support for the signalling hypothesis for only these two measures of profitability.

Profitability changes of dividend-decreasing firms experience negative growth in year 0, significant at the 1% level. In one year prior to dividend decreases (year -1), dividend decreasing firms experience significant profitability improvement (for most of our profitability measures). For year 1, there is an insignificant growth in profitability of firms that decrease their dividends. These results suggest that dividend-decreasing firms are correlated with current profitability reduction.

The mean profitability changes for dividend-initiation firms are positive and highly significant in year 0. However, we find no significant increases in profitability before or after the dividend initiation. In fact, we observe a negative profitability growth in the year following dividend

initiation. This result is inconsistent with Lintner (1956) and Healy and Palepu (1988), who find that firms that initiate dividends experience permanent earnings growth.

Table 3.4. Profitability changes around dividend changes

	Panel A: Unadjusted profitability changes					Panel B: Adjusted profitability changes				
	Year -2	Year -1	Year 0	Year 1	Year 2	Year -2	Year -1	Year 0	Year 1	Year 2
Panel A. Dividend increases (n=356)										
<i>ECHG</i>	0.005	0.025**	0.025**	-0.022	-0.01	-0.040*	-0.012	0.035***	-0.021	-0.013
	(0.260)	(2.065)	(2.429)	(-0.984)	(-0.350)	(-1.833)	(-0.970)	(2.711)	(-0.924)	(-0.456)
<i>ROECHG</i>	0.006	0.011**	0.013***	-0.008	-0.004	-0.001	0.006	0.014***	-0.004	0.001
	(1.008)	(2.332)	(4.047)	(-1.554)	(-0.502)	(-0.233)	(1.186)	(4.417)	(-0.663)	(0.172)
<i>EDMV</i>	0.088***	0.080**	0.049***	0.015**	0.016	0.063*	0.044	0.028***	-0.001	-0.020*
	(2.618)	(2.558)	(7.208)	(2.184)	(1.552)	(1.878)	(1.427)	(4.092)	(-0.168)	(-1.809)
<i>EDBV</i>	0.020***	0.024***	0.030***	0.009	0.013*	0.003	0.004	0.025***	0.004	0.001
	(3.784)	(4.552)	(8.040)	(1.613)	(1.769)	(0.503)	(0.731)	(6.456)	(0.690)	(0.125)
Panel B. Dividend decreases (n=243)										
<i>ECHG</i>	0.041*	0.018*	-0.034***	0.007	-0.008	-0.009	-0.021**	-0.055***	0.008	-0.011
	(1.704)	(1.839)	(-5.402)	(0.746)	(-0.646)	(-0.361)	(-2.117)	(-8.701)	(0.827)	(-0.836)
<i>ROECHG</i>	0.019**	0.006	-0.028***	0.002	-0.002	0.011	0.001	-0.027***	0.006	0.003
	(2.009)	(1.055)	(-8.073)	(0.354)	(-0.381)	(1.195)	(0.014)	(-8.038)	(1.170)	(0.661)
<i>EDMV</i>	0.070***	0.047**	-0.022***	0.012	0.006	0.045*	0.011	-0.044***	-0.004	-0.028***
	(2.699)	(2.467)	(-3.494)	(1.246)	(0.774)	(1.728)	(0.588)	(-7.125)	(-0.417)	(-3.413)
<i>EDBV</i>	0.027***	0.047**	-0.022***	0.012	0.006	0.009	0.027	-0.028***	0.007	-0.006
	(2.740)	(2.467)	(-3.494)	(1.246)	(0.774)	(0.905)	(1.442)	(-4.515)	(0.672)	(-0.731)
Panel C. Dividend initiations (n=101)										
<i>ECHG</i>	0.028	-0.033	0.141***	-0.065***	0.001	-0.014	-0.069	0.125***	-0.063***	-0.002
	(0.662)	(-0.480)	(3.631)	(-3.106)	(0.077)	(-0.330)	(-0.986)	(3.214)	(-3.041)	(-0.152)
<i>ROECHG</i>	-0.006	-0.005	0.065***	-0.032***	0.008	-0.012	-0.011	0.067***	-0.026***	0.013
	(-0.418)	(-0.249)	(4.052)	(-3.165)	(0.729)	(-0.916)	(-0.536)	(4.154)	(-2.674)	(1.220)
<i>EDMV</i>	-0.052	0.053	0.332***	-0.088	0.012	-0.075	0.019	0.313**	-0.104	-0.025
	(-0.599)	(1.584)	(2.696)	(-1.299)	(0.684)	(-0.878)	(0.551)	(2.545)	(-1.536)	(-1.392)
<i>EDBV</i>	0.009	0.004	0.081***	-0.019**	0.018	-0.008	-0.017	0.075***	-0.023**	0.005
	(0.582)	(0.225)	(4.515)	(-1.969)	(1.547)	(-0.480)	(-0.987)	(4.195)	(-2.492)	(0.454)
Panel D. Dividend omissions (n=73)										
<i>ECHG</i>	-0.025	0.129**	-0.252**	0.061	-0.025	-0.058*	0.099	-0.262**	0.063	-0.029
	(-0.786)	(2.070)	(-2.525)	(1.043)	(-0.786)	(-1.684)	(1.591)	(-2.601)	(1.085)	(-0.915)
<i>ROECHG</i>	-0.007	0.042***	-0.125***	0.064*	-0.035*	-0.013	0.036**	-0.123***	0.071**	-0.029
	(-0.555)	(2.649)	(-3.070)	(1.853)	(-1.968)	(-1.082)	(2.269)	(-3.018)	(2.041)	(-1.649)
<i>EDMV</i>	0.036	0.152*	-0.345**	0.251	-0.123	0.012	0.118	-0.363**	0.235	-0.164
	(1.453)	(1.932)	(-2.261)	(1.182)	(-1.157)	(0.497)	(1.501)	(-2.386)	(1.106)	(-1.530)
<i>EDBV</i>	0.001	0.064***	-0.090***	0.077**	-0.029*	-0.016	0.043*	-0.096***	0.072*	-0.041**
	(0.079)	(2.930)	(-4.154)	(1.997)	(-1.696)	(-1.175)	(1.953)	(-4.398)	(1.891)	(-2.459)

Note. This table shows profitability changes surrounding dividend changes. Panel A displays unadjusted profitability changes for dividend-changing firms. Panel B shows the adjusted profitability performance of dividend-changing firms calculated as profitability changes for dividend-changing firms less profitability changes for those firms that did not change their dividends in year 0 in the same industry. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively using a two-tailed t-test for the means.

Also, these results do not support Ho and Wu (2001) and Fukuda (2000), who find that dividend-initiating firms experienced earnings growth in year -1. Dividend omitting firms experience significant and negative profitability changes in year 0. However, they have significant positive profitability growth in year -1. For year 1, they experience positive profitability growths that are significant for two measures of profitability.

3.6.1.2 Adjusted profitability

Next, we consider the relation between dividend changes and adjusted profitability changes. The results in Panel B of Table 3.4 show that in year 0, dividend increasing firms perform significantly better than no-dividend change firms. However, this relationship does not hold before and after the dividend changes for most of our measures. Firms that chose to decrease dividends perform significantly worse than no-dividend change firms in year 0. The profitability measure (*EDMV*) is negative and significant in year 2 which indicates that firms that decrease dividends experience a negative *EDMV* growth in year 2. Dividend-initiating firms experience significant positive profitability improvement in year 0, and negatively significant profitability growth in the following year, compared to firms that chose not to change their dividend. Dividend-omitting firms perform significantly worse than no-dividend change firms in the announcement year (year 0). However, they experience profitability growth in years -1 and 1.

Our findings in Panel B reveal a strong relationship between dividend changes and current adjusted profitability changes. The signalling hypothesis suggests that changes in dividend should be informative about future profitability. On this basis, we find little support for the information content of dividend changes.

3.6.2 Regression analysis

In this section, we examine the relationship between dividends and profitability in more depth, using regression analysis. We begin by using a linear model. Following the method of Nissim and Ziv (2001), we gradually make the analysis more sophisticated by adding in variables, finally splitting the analysis into positive and negative dividend changes. Then we follow Grullon *et al.* (2005) by considering a superior non-linear model.

3.6.2.1 Linear mean reversion in earnings

In this section we investigate the link between dividend changes and profitability changes using a linear model of profitability expectations. We begin our analysis by examining the relation

between dividend changes and current and future profitability changes using the following basic model:

$$PROFCHG_t = \beta_0 + \beta_1 DIVCH_0 + \varepsilon_t \quad (3.1)$$

where $PROFCHG_t$ denotes the profitability measures ($EDBV$, $EDMV$, $ROECHG$ and $ECHG$) in year 0, 1 and 2, where year 0 is the dividend change year. All variables are defined in Table 3.1. The basic assumption of this model is that earnings follow a random walk.

Table 3.5 reports the OLS pooled regression output with heteroskedasticity robust White's (1980) t-statistics for years 0, 1 and 2. The results in Panel A of Table 3.5 show a positive relation between dividend changes and all current profitability measures in year 0, where the mean coefficients of dividend changes are positive and highly significant at 1%. However, dividend changes have no power in predicting future profitability changes in year 1 and 2, indicating that dividend changes are not informative about future profitability changes consistent with the earlier studies of Benartzi *et al.* (1997) in the U.S. In Panel B, the coefficients of dividend increases are significantly positive with current profitability changes amongst most profitability measures. For year 1 and 2, we find a significant negative coefficient in the change of return on equity ($ROECHG$) which suggest firms experience a reduction on the change in return of equity subsequent to dividend increases: this stands in sharp contrast to the signalling theory of dividends. In the case of dividend decreases, we find insignificant profitability changes for all years, as shown in Panel C of Table 3.5.¹⁹

However, Nissim and Ziv (2001) argue that the dependent variable $EDMV$ in Eq. (3.1) suffers from two specification issues. First, dividend changes might be correlated with the dependent variable. Second, there may be the omission of important control variables. In addressing these issues, they divide the change in earnings by the book value of the equity at the beginning of the year instead of the market value of equity, and they include the lagged return of equity (ROE_{t-1}) as a control variable. Hence, following Nissim and Ziv (2001), our next step is to add a control variable ROE_{t-1} in Eq. (3.1) to produce the following model:

$$EDBV_t = \beta_0 + \beta_1 DIVCH_0 + \beta_2 ROE_{t-1} + \varepsilon_t \quad (3.2)$$

For $\tau = 1$ and 2, where $EDBV_t$ is defined as the annual change in earnings divided by the book value of equity at the beginning of the announcement year.

¹⁹ The results are qualitatively similar to those reported in Table 3.5 when we use the change in return on assets as a profitability measure.

Table 3.5. Dividend changes and current and future profitability changes

Dependent Variables	<i>EDBV</i>			<i>EDMV</i>			<i>ECHG</i>			<i>ROECHG</i>		
	$\tau=0$	$\tau=1$	$\tau=2$	$\tau=0$	$\tau=1$	$\tau=2$	$\tau=0$	$\tau=1$	$\tau=2$	$\tau=0$	$\tau=1$	$\tau=2$
Panel A. Dividend changes (n = 599)												
Intercept	0.0102*** (3.12)	0.0131*** (3.27)	-0.00333 (-0.52)	0.0249** (2.03)	0.0308** (2.51)	-0.0270 (-0.80)	-0.129 (-0.28)	-0.0824 (-0.94)	-0.274 (-1.12)	-0.00268 (-0.31)	-0.0321 (-1.09)	-0.0355 (-0.75)
DIVCHG	0.0404*** (5.53)	-0.00822 (-1.27)	0.00311 (0.23)	0.0996*** (3.67)	-0.0128 (-0.55)	0.0282 (0.78)	1.823*** (2.65)	0.264 (1.32)	-1.781 (-0.93)	0.0578*** (3.84)	-0.0203 (-1.38)	0.0440 (0.46)
Adj.R ² (%)	10.1	0.131	-0.151	4.02	-0.0792	-0.114	0.007	0.008	0.007	3.14	-0.129	-0.0779
Panel B. Dividend increases (n = 356)												
Intercept	0.0233*** (4.29)	0.00666 (0.74)	0.00341 (0.23)	0.0298*** (2.90)	-0.00340 (-0.22)	-0.000345 (-0.01)	0.346*** (4.67)	0.134*** (6.46)	0.415 (0.50)	0.00393 (0.28)	-0.0117 (-1.04)	0.0119 (0.80)
DIVCHG	0.0149** (2.39)	0.00423 (0.55)	-0.0105 (-0.47)	0.0356** (2.45)	0.0277 (1.12)	-0.0285 (-0.63)	0.264** (2.73)	0.0198 (0.96)	-3.311 (-0.91)	0.0251 (1.00)	-0.0191* (-1.86)	-0.0329** (-2.19)
Adj.R ² (%)	3.81	-0.463	-0.268	6.87	1.45	0.0815	0.055	-0.003	0.006	3.68	0.822	1.09
Panel C. Dividend decreases (n = 243)												
Intercept	-0.0103 (-1.32)	0.0118 (0.94)	0.00811 (0.53)	-0.0204* (-1.88)	0.0150 (1.00)	0.00282 (0.09)	0.451** (2.10)	0.088* (1.96)	0.135*** (3.28)	-0.0514** (-2.42)	-0.0158 (-0.83)	0.0136 (0.64)
DIVCHG	0.0258 (1.22)	-0.00613 (-0.19)	0.0229 (0.51)	0.0134 (0.46)	0.00615 (0.13)	0.0414 (0.44)	-0.076 (-1.05)	-0.073 (-0.50)	0.154 (0.86)	-0.00282 (-0.04)	-0.0573 (-0.86)	0.0665 (0.93)
Adj.R ² (%)	0.265	-1.44	-1.02	-1.21	-1.45	-1.02	0.027	-0.01	-0.01	-1.47	-0.591	0.743

Note. This table reports the regressions regarding the effects of current and future profitability on dividend changes. Panel A shows the results for all dividend changes. The results for dividend increases and decreases are presented in Panels B and C, respectively. The first row represents the coefficient and the second row represents White's (1980) t-statistics for each regression. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

Similar to earlier work of Nissim and Ziv (2001) and Grullon *et al.* (2005), we extend Eq. (3.2) further and estimate the following model, which includes dummy variables to allow for different coefficients for dividend increases and decreases:

$$EDBV_t = \beta_0 + \beta_{1P}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + \beta_2ROE_{t-1} + \beta_3EDBV_0 + \beta_4DPC + \beta_5DIVCH_0 + \beta_6DNC_0 + \varepsilon_t \quad (3.3)$$

where $DPC_0(DNC_0)$ is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. All other variables are defined as the same as in Eq. (3.2). Following Nissim and Ziv (2001) and Grullon *et al.* (2005), we use the Fama and MacBeth (1973) method to account for the problem associated with residual cross-correlation.

Table 3.6. Dividend changes and future profitability changes

Dependent variable = $EDBV_t$	Panel A				Panel B			
	OLS		CS		OLS		CS	
	$\tau=1$	$\tau=2$	$\tau=1$	$\tau=2$	$\tau=1$	$\tau=2$	$\tau=1$	$\tau=2$
Intercept	0.00696 (0.80)	0.0194* (1.85)	0.0118 (1.33)	0.0111 (1.06)	0.00963 (0.98)	0.0166 (1.47)	0.0166** (3.16)	0.00650 (0.77)
$DIVCHG_0$	-0.00394 (-0.58)	0.0198 (1.62)	-0.00000125 (-0.00)	0.0220 (1.66)	0.00376 (0.33)	0.0365** (2.41)	-0.00457 (-0.36)	0.0507** (2.33)
$DPC_0 \times DIVCHG_0$					0.0116 (1.26)	-0.0297 (-1.29)	0.0286 (1.47)	-0.0658*** (-3.50)
$DNC_0 \times DIVCHG_0$					-0.0241 (-0.72)	-0.0605 (-1.29)	0.0124 (0.28)	-0.110 (-1.57)
ROE_0	-0.0785*** (-3.09)		-0.0854*** (-5.14)		-0.0376** (-2.28)		-0.0419 (-1.79)	
ROE_1		-0.0758** (-2.33)		-0.0791** (-3.18)		-0.0772** (-2.33)		-0.0764** (-2.51)
$EDBV_0$					-0.394*** (-3.62)	0.0743 (0.58)	-0.312* (-1.96)	0.0639 (0.42)
DPC_0					0.00528 (0.61)	0.00644 (0.44)	0.00196 (0.15)	0.0161 (1.28)
DNC_0					-0.0133 (-0.92)	-0.00495 (-0.29)	0.00204 (0.14)	-0.0130 (-0.84)
Year & Industry effects	Yes	Yes			Yes	Yes		
Number of observations	599	599	599	599	599	599	599	599
R ²	0.108	0.0933			0.180	0.104		
Adj. R ²	0.0928	0.0770	0.0624	0.0730	0.159	0.0802	0.287	0.183
Prob > F	0.0000	0.0000	0.0000	0.0143	0.0000	0.0000	0.0000	0.0037

Note. This table presents the regression output related to the link between profitability changes and dividend changes. DPC is a dummy variable that takes the value of 1 when firm increase dividends, and 0 otherwise. DNC is a dummy variable that takes the value of 1 when firm decrease dividends, and 0 otherwise. All other variables are defined in Table 3.1. OLS reports the regressions using robust standard error. CS reports the regressions based on the Fama and MacBeth (1973) procedure. The t-statistics are reported in parentheses. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

The results in Table 3.6 report the regression outputs from Eq. (3.2) and Eq. (3.3) in Panels A and B, respectively. Each panel report two different regression outputs; OLS, which is pooled regression with robust standard errors, and CS, which is a cross-sectional regression, following Fama and MacBeth's (1973) methodology. Panel A of Table 3.6 shows that the coefficients of dividend changes ($DIVCHG_0$) are insignificant for years 1 and 2 in both the OLS and CS Models. Also, ROE_t is negative and significant in years 1 and 2 for both models. Thus, the results demonstrate the importance of the specification issues, but do not support the information content of the dividend hypothesis (in contrast to Nissim and Ziv, 2001).

The results in Panel B of Table 3.6 reveal that the coefficient of dividend increases is significant only in the CS Model in year 2 but with the wrong sign.²⁰ This suggests that firms that increase dividends experience a negative growth in profitability in year 2, which is inconsistent with the information content of dividend. Panel B also shows no association between dividend decreases and future profitability in the subsequent years.²¹

We extend our analysis further by including more control variables, similar to the earlier studies (e.g., Kato *et al.*, 2002). The dependent variable is the change in profitability ($EDBV$) in years 1 and 2, and the dividend change is the main explanatory variable. We include size, asset growth, market to book ratio, leverage, dividend yield, firm maturity and change in retained earnings in the prior year to the announcement of dividend changes as additional control variables:

$$PROFCHG_t = \beta_0 + \beta_1 DIVCH_0 + \beta_2 SIZE_{-1} + \beta_3 Growth_{-1} + \beta_4 MB_{-1} + \beta_5 Lev_{-1} + \beta_6 YLD_{-1} + \beta_7 AGE_{-1} + \beta_8 RETACHG_0 + \beta_8 RETACHG_{-1} + \varepsilon_t \quad (3.4)$$

where $PROFCHG_t$ denotes the profitability measures ($EDBV$) in years 1 and 2, and year 0 is the dividend change year. All other variables are defined in Table 3.1.

The estimated output of Eq. (3.4) is reported in Table 3.7. The results reveal no significant association between dividend changes and future profitability for the following two years as is shown in Models 1 and 2. Similarly, the coefficients of dividend increases remain insignificant in years 1 and 2 as stated in Models 3 and 4, respectively. We find an association between dividend decreases and future profitability in year 1: however, it is negative and significant at 10% (as in Model 5). This result indicates that dividend decreases signal a reduction in firms' profitability in

²⁰ Benartzi et al. (1997) find that the relationship between dividend decrease and earnings in year 1 is significantly negative. Similar results are obtained by Kato et al. (2002) for years 1 and 2. These results are inconsistent with the dividend signalling hypothesis.

²¹ We repeat the same analyses using Eq. (3.1) and (3.2), using fixed effects on panel data with clustering at firm level. The estimated coefficients of dividend changes from Eq. (3.1) are statistically insignificant in each of the subsequent two years. The regression output from Eq. (3.2) also provides no evidence of the signalling theory of dividends in the following two years.

the following year which is in line with the information content of dividends. These findings stand in sharp contrast to the recent study of Aggarwal *et al.* (2012), where they find that dividend increases convey information about future profitability in the case of dividend increases but dividend decreases have no association with future profitability.²²

Table 3.7. Dividend changes, future profitability and additional control variables

Dependent variable = EDBV _t						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	$\tau=1$	$\tau=2$	$\tau=1$	$\tau=2$	$\tau=1$	$\tau=2$
Intercept	-0.0149 (-0.38)	0.00470 (0.10)	-0.00713 (-0.12)	0.00150 (0.02)	0.102 (1.29)	-0.0589 (-1.08)
DIVCH	-0.00796 (-1.16)	0.0126 (1.05)				
DIVINC			-0.00292 (-0.22)	-0.00193 (-0.08)		
DIVDEC					-0.0732* (-1.77)	-0.0118 (-0.42)
Size	0.00434 (0.99)	0.000435 (0.08)	-0.00279 (-0.41)	-0.00613 (-0.72)	-0.00748 (-1.31)	0.00686 (1.47)
Growth	-0.0238 (-0.75)	-0.0142 (-0.46)	0.0190 (0.34)	0.0158 (0.29)	-0.0106 (-0.11)	0.00417 (0.16)
M/B	-0.00391 (-0.95)	-0.00262 (-0.62)	-0.00677 (-1.33)	0.00389 (0.49)	-0.00164 (-0.20)	0.00623 (1.47)
Lev	0.0312* (1.77)	0.0255 (1.23)	0.0597 (1.45)	0.0809* (1.70)	0.000213 (0.01)	-0.0443 (-1.57)
YLD	-0.0721 (-1.04)	-0.00569 (-0.09)	0.144 (0.62)	0.0969 (0.36)	-0.261** (-2.31)	0.0503 (0.54)
Age	-0.00768 (-1.08)	-0.00187 (-0.21)	-0.00399 (-0.30)	-0.00267 (-0.13)	-0.00905 (-0.56)	-0.00107 (-0.09)
RETACH	-0.0765*** (-2.83)	0.0202 (0.60)	-0.0711 (-0.41)	-0.281 (-1.52)	-0.204 (-1.63)	0.0286 (0.37)
RETACH ₋₁	-0.0207 (-1.03)	0.0197 (0.76)	-0.0359 (-0.62)	-0.0441 (-0.42)	-0.157 (-1.55)	-0.00121 (-0.02)
Year & Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	599	599	356	356	243	243
R ²	0.112	0.0704	0.152	0.192	0.466	0.333
Adj. R ²	0.0867	0.0438	0.0598	0.104	0.318	0.149
p-value	0.0000	0.0001	0.0028	0.0008	0.0000	0.0002

Note. This table reports the estimated outputs regarding the link between future profitability (at year 1 and 2) and all dividends changes (DIVCHG), dividend increases (DIVINC) and dividend decreases (DIVDEC), by also considering some control variables. All variables are defined in Table 3.1. The figures in parentheses are the t-statistics. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

²² We obtain similar results when using other measure of profitability (EMV).

Our results in this section show a strong association between dividend changes and changes in current profitability. Furthermore, the results provide support to the information content of dividends only in the case of earnings decreases in year 1 following dividend decreases in year 0.

3.6.2.2 The non-linear model

Grullon *et al.* (2005) argue that the linear analysis in the previous section is likely to produce biased results because it assumes uniformity of the mean reversion and the level of autocorrelation across all observations. To overcome misspecifications and to control for the non-linearity, they suggested the use of the modified partial adjustment model developed by Fama and French (2000) as follows:

$$\begin{aligned} EDBV_t = & \beta_0 + \beta_{1P}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 \\ & + (\gamma_1 + \gamma_2NDFED_0 + \gamma_3NDFED_0 \times DFE_0 + \gamma_4PDFED_0 \times DFE_0) \times DFE_0 \\ & + (\lambda_1 + \lambda_2NCED_0 + \lambda_3NCED_0 \times CE_0 + \lambda_4PCED_0 \times CE_0) \times CE_0 + \varepsilon_t \end{aligned} \quad (3.5)$$

where DFE_0 is $ROE_0 - E[ROE_0]$; $E[ROE_0]$ is the fitted value from the cross-sectional regression of ROE_0 on the logarithm of total assets in year -1, the logarithm of the market-to-book ratio in year -1, and ROE_{-1} ; CE_0 is $EDBV_0$; $NDFED_0$ ($PDFED_0$) is a dummy variable that takes the value of 1 if DFE_0 is negative (positive) and 0 otherwise; and $NCED_0$ ($PCED_0$) is a dummy variable that takes the value of 1 if DFE_0 is negative (positive) and 0 otherwise. All other variables are as defined as in Eq. (3.3). The mean reversion in $EDBV_t$ is captured by the coefficient γ_1 . The coefficients γ_2 , γ_3 and γ_4 measure nonlinear mean revision in $EDBV_t$ which indicates that the reversals are stronger for larger rather than smaller changes in either sign. The coefficient λ_1 measures the autocorrelation of $EDBV_t$. The coefficients λ_2 , λ_3 and λ_4 measure nonlinearity in the autocorrelation of $EDBV_t$.

Table 3.8 reveals the results for the estimation of nonlinear model in Eq. (3.5). Similar to our findings in Table 3.6, we find no evidence of a relationship between dividend changes and future profitability changes. The coefficients for positive (β_{1P}) and negative (β_{1N}) dividend changes are statistically insignificant in both years following the dividend changes. These results provide no support to the signalling hypothesis of dividends in Oman; this is consistent with Grullon *et al.* (2005) in the US.

Further, the results in Table 3.8 show the importance of the nonlinear model in explaining a large fraction of the cross-sectional variation in profitability changes compared to the linear model in

Table 3.6. That is, the average adjusted R^2 increases from 9.7% to 43% and from 9.3% to 31.6% in year 1 and 2, respectively. These results are consistent with Grullon *et al.* (2005) for the US.

3.6.2.3 Additional analyses

In this section, following Grullon *et al.* (2005), we perform a number of additional analyses to verify the robustness of our results by replicating all of the analysis in the previous section, using alternative dependent variables that measure firms' profitability; a) the change in the profitability level and b) the future profitability level.

3.6.2.3.1 Dividend changes and changes in future profitability level

Instead of the change in earnings scaled by the book value of equity $EDBV_t$, here we use the change in ROA as the dependent variable; and ROA, instead of $EDBV_0$, as the independent variable, and we re-estimate all of the regressions in the previous subsection, using the linear and nonlinear model as follows:

$$ROA_t - ROA_{t-1} = \beta_0 + \beta_{1P}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + \beta_2ROA_{t-1} + \beta_3(ROA_0 - ROA_{-1}) + \varepsilon_t \quad (3.6)$$

$$ROA_t - ROA_{t-1} = \beta_0 + \beta_{1P}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + (\gamma_1 + \gamma_2NDFED_0 + \gamma_3NDFED_0 \times DFE_0 + \gamma_4PDFED_0 \times DFE_0) \times DFE_0 + (\lambda_1 + \lambda_2NCED_0 + \lambda_3NCED_0 \times CE_0 + \lambda_4PCED_0 \times CE_0) \times CE_0 + \varepsilon_t \quad (3.7)$$

where ROA_t is equal to the operating income before depreciation in year t divided by total assets at the end of year t . DFE_0 is $ROA_0 - E[ROA_0]$; $E[ROA_0]$ is the fitted value from the cross-sectional regression of ROA_0 on the logarithm of total assets in year -1, the logarithm of the market-to-book ratio in year -1, and ROA_{-1} . CE_0 is $ROA_0 - ROA_{-1}$. All other variables are defined the same as Eq. (3.5).

Panels A and B in Table 3.9 summarize the regression results from the linear and nonlinear model of profitability, respectively. Panel A shows that in year 1 and 2, the relation between positive dividend changes and future profitability is insignificant. Similar results are revealed for negative dividend changes. The nonlinear earnings model in panel B suggests that neither the positive nor the negative dividend changes are correlated with future changes in profitability. Further, the adjusted R^2 is much higher in the nonlinear model (Panel B) compared with the linear model in Panel A, suggesting the nonlinear behaviour of profitability.

Table 3.8. Dividend changes and future earnings changes
$$EDBV_t = \beta_0 + \beta_{1p}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + (\gamma_1 + \gamma_2NDFED_0 + \gamma_3NDFED_0 \times DFE_0 + \gamma_4PDFED_0 \times DFE_0) \times DFE_0 \\ + (\lambda_1 + \lambda_2NCED_0 + \lambda_3NCED_0 \times CE_0 + \lambda_4PCED_0 \times CE_0) \times CE_0 + \varepsilon_t$$

Year	β_0	β_{1p}	β_{1N}	γ_1	γ_2	γ_3	γ_4	λ_1	λ_2	λ_3	λ_4	Adjusted R ²
$\tau=1$	0.00249 (0.35)	0.00908 (0.76)	-0.0137 (-0.93)	-0.0307 (-0.70)	0.0199 (0.12)	0.822 (0.82)	-0.0342 (-0.71)	0.578* (2.11)	-0.685 (-1.29)	6.186** (2.40)	-3.618** (-2.41)	43.60%
$\tau=2$	0.0257* (2.09)	-0.0216 (-0.88)	0.00256 (0.09)	-0.193 (-1.05)	0.432 (0.82)	0.321 (0.44)	0.00865 (0.08)	0.126 (0.33)	0.0773 (0.09)	-3.556 (-0.66)	1.902 (0.89)	31.60%

Note. This table reports regressions regarding the link between raw earnings changes and dividend changes. E_t is the earnings in year t (year 0 is the event year). B_{-1} is the book value of equity at the end of year -1. $DIVCH_0$ is the annual change in cash dividends in year 0. DPC_0 (DNC_0) is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. ROE_t is earnings in year t divided by the book value of equity at the end of year t . DFE_0 is $ROE_0 - E[ROE_0]$, where $E[ROE_0]$ is the fitted value from the cross-sectional regression of ROE_0 on the logarithm of total assets in year -1, the logarithm of the market-to-book ratio in year -1, and ROE_{-1} . CE_0 is $(E_0 - E_{-1})/B_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is negative and 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. The numbers in parentheses are t-statistics computed using White's (1980) heteroskedasticity consistent standard errors. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

Table 3.9. Dividend changes and future changes in return on assets (ROA)

Panel A. Time-series means of the cross-sectional regression coefficients from the linear model

$$ROA_t - ROA_{t-1} = \beta_0 + \beta_{1p}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + \beta_2ROA_{t-1} + \beta_3(ROA_0 - ROA_{-1}) + \varepsilon_t$$

Year	β_0	β_{1p}	β_{1N}	β_2	β_3	Adjusted R ²
$\tau=1$	0.0146** (3.13)	0.0138 (1.60)	0.0116 (0.74)	-0.254*** (-5.58)	-0.321*** (-3.99)	38.10%
$\tau=2$	0.0214*** (4.90)	-0.00197 (-0.16)	-0.0189 (-1.66)	0.0935 (1.40)	-0.409*** (-8.09)	26.20%

Panel B. Time-series means of the cross-sectional regression coefficients from the nonlinear model

$$ROA_t - ROA_{t-1} = \beta_0 + \beta_{1p}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + (\gamma_1 + \gamma_2NDFED_0 + \gamma_3NDFED_0 \times DFE_0 + \gamma_4PDFED_0 \times DFE_0) \times DFE_0 + (\lambda_1 + \lambda_2NCED_0 + \lambda_3NCED_0 \times CE_0 + \lambda_4PCED_0 \times CE_0) \times CE_0 + \varepsilon_t$$

Year	β_0	β_{1p}	β_{1N}	γ_1	γ_2	γ_3	γ_4	λ_1	λ_2	λ_3	λ_4	Adjusted R ²
$\tau=1$	-0.00553 (-1.40)	0.00619 (0.68)	-0.00666 (-0.37)	-0.315 (-0.82)	0.470 (0.78)	9.865** (3.09)	-3.133 (-0.59)	0.578 (1.24)	-0.815 (-1.06)	-6.837** (-2.53)	-3.365 (-0.60)	53.20%
$\tau=2$	0.00977 (1.66)	-0.0212 (-1.46)	0.000654 (0.03)	-0.263 (-0.71)	0.0831 (0.11)	-0.829 (-0.18)	0.929 (0.17)	0.0829 (0.40)	0.500 (0.67)	1.844 (0.43)	0.277 (0.08)	33.60%

Note. This table reports regression results relating changes in ROA to dividend changes. ROA_t is operating income scaled by total assets at the end of year t . $DIVCH_0$ is the annual change in the cash dividend in year 0. $DPC_0(DNC_0)$ is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. DFE_0 is $ROA_0 - E[ROA_0]$, where $E[ROA_0]$ is the fitted value from the cross-sectional regression of ROA_0 on the logarithm of total assets in year -1, the logarithm of the market-to-book ratio in year -1, and ROA_{-1} . CE_0 is $ROA_0 - ROA_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is negative and 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if DFE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. The numbers in parentheses are t-statistics computed using White's (1980) heteroskedasticity consistent standard errors. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

3.6.2.3.2 Dividend changes and future profitability levels

In this section, we analyse the relationship between dividend changes and future profitability levels to verify our results in the previous sections and to make our findings comparable with the earlier study of Grullon *et al.* (2005) in the US. Using future profitability levels, we re-examine the correlation between future profitability levels and changes in dividend, using the following two models:

$$ROE_t = \beta_0 + \beta_{1P}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + \beta_2ROE_{t-1} + \beta_3(ROE_0 - ROE_{-1}) + \beta_4 \log(MB_{-1}) + \beta_5SIZE_{-1} + \varepsilon_t \quad (3.8)$$

$$ROE_t = \beta_0 + \beta_{1P}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + (\gamma_1 + \gamma_2NDFED_0 + \gamma_3NDFED_0 \times ROE_0 + \gamma_4PDFED_0 \times ROE_0) \times ROE_0 + (\lambda_1 + \lambda_2NCED_0 + \lambda_3NCED_0 \times CE_0 + \lambda_4PCED_0 \times CE_0) \times CE_0 + \beta_1 \log(MB_{-1}) + \beta_2SIZE_{-1} + \varepsilon_t \quad (3.9)$$

All variables are defined in Table 3.1 and in Eq. (3.5). The results are summarized in Table 3.10. Panel A shows that there is no association between dividend changes and the future level of ROE in both years using the linear model. Further, consistent with recent studies in the U.S., the nonlinear earnings model in panel B of Table 3.10 shows that there is no evidence on the relation between past dividend changes and the level of future profitability.

We repeat the previous analyses using ROA as the dependent variable, instead of ROE and ROA₋₁, and ROA₀-ROA₋₁ as the independent variables, instead of ROE₋₁ and ROE₀-ROE₋₁.

$$ROA_t = \beta_0 + \beta_{1P}DPC_0 \times RADIV_0 + \beta_{1N}DNC_0 \times RADIV_0 + \beta_2ROA_{t-1} + \beta_3(ROA_0 - ROA_{-1}) + \beta_4 \log(MB_{-1}) + \beta_5SIZE_{-1} + \varepsilon \quad (3.10)$$

$$ROA_t = \beta_0 + \beta_{1P}DPC_0 \times RADIV_0 + \beta_{1N}DNC_0 \times RADIV_0 + (\gamma_1 + \gamma_2NDFED_0 + \gamma_3NDFED_0 \times ROA_0 + \gamma_4PDFED_0 \times ROA_0) \times ROA_0 + (\lambda_1 + \lambda_2NCED_0 + \lambda_3NCED_0 \times CE_0 + \lambda_4PCED_0 \times CE_0) \times CE_0 + \beta_1 \log(MB_{-1}) + \beta_2SIZE_{-1} + \varepsilon_t \quad (3.11)$$

The estimated outputs of Eq. (3.10) and Eq. (3.11) are reported in Tables 3.11 Panels A and B, respectively. The results indicate that the coefficients of positive and negative dividend changes, in both the linear and nonlinear models of profitability, are not significant. This suggests that dividend changes are not informative about the level of future profitability.

Table 3.10. Dividend changes and future changes in return on equity (ROE)

Panel A. Time-series means of the cross-sectional regression coefficients from the linear model								
$ROE_t = \beta_0 + \beta_{1p}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + \beta_2ROE_{t-1} + \beta_3(ROE_0 - ROE_{-1}) + \beta_4 \log(MB_{-1}) + \beta_5SIZE_{-1} + \varepsilon_t$								
Year	β_0	β_{1p}	β_{1N}	β_2	β_3	β_4	β_5	Adjusted R ²
$\tau=1$	-12.73 (-1.03)	-0.0587 (-0.22)	8.239 (0.98)	-11.83 (-0.98)	1.785 (0.81)	8.597 (1.02)	-12.73 (-1.03)	38.10%
$\tau=2$	-15.12 (-1.01)	-0.839 (-1.09)	0.317 (1.34)	-5.701 (-1.01)	4.645 (0.98)	2.030 (1.01)	-35.53 (-0.99)	32.10%

Panel B. Time-series means of the cross-sectional regression coefficients from the nonlinear model														
$ROE_t = \beta_0 + \beta_{1p}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + (\gamma_1 + \gamma_2NDFED_0 + \gamma_3NDFED_0 \times ROE_0 + \gamma_4PDFED_0 \times ROE_0) \times ROE_0$ $+ (\lambda_1 + \lambda_2NCED_0 + \lambda_3NCED_0 \times CE_0 + \lambda_4PCED_0 \times CE_0) \times CE_0 + \vartheta_1 \log(MB_{-1}) + \vartheta_2SIZE_{-1} + \varepsilon_t$														
Year	β_0	β_{1p}	β_{1N}	γ_1	γ_2	γ_3	γ_4	λ_1	λ_2	λ_3	λ_4	ϑ_1	ϑ_2	Adjusted R ²
$\tau=1$	-0.167 (-.087)	0.0147 (0.15)	0.395 (1.27)	-0.405 (-0.29)	5.90 (0.81)	12.78 (0.92)	0.505 (0.28)	1.014 (1.80)	-4.157 (-0.97)	-9.176 (-0.84)	-1.732 (-1.75)	0.132 (0.56)	0.0386 (2.46)	41.20%
$\tau=2$	-2.938 (-0.93)	-1.94 (-1.63)	-0.123 (-0.98)	3.583 (0.98)	-7.257 (-.97)	-12.34 (-0.84)	-1.16 (-0.76)	-2.234 (-1.03)	3.25 (1.00)	7.67 (0.97)	3.89 (0.87)	-0.335 (-1.38)	-0.168 (-0.88)	37.50%

Note. This table reports regression results relating ROE levels to dividend changes. ROE_t is earnings dividend by the book value of equity at the end of year t . $DIVCH_0$ is the annual change in the cash dividend in year 0. $DPC_0(DNC_0)$ is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. CE_0 is equal to $ROE_0 - ROE_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if ROE_0 is negative and 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if ROE_0 is positive and 0 otherwise. $NCED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. $\log(MB_{-1})$ is the logarithm of the market-to-book ratio of equity in year -1. $SIZE_{-1}$ is the logarithm of total assets in year -1. The numbers in parentheses are t-statistics computed using White's (1980) heteroskedasticity consistent standard errors. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

Table 3.11. Dividend changes and future return on assets (ROA)

Panel A. Time-series means of the cross-sectional regression coefficients from the linear model								
$ROA_t = \beta_0 + \beta_{1p}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + \beta_2ROA_{t-1} + \beta_3(ROA_0 - ROA_{-1}) + \beta_4 \log(MB_{-1}) + \beta_5SIZE_{-1} + \varepsilon_t$								
Year	β_0	β_{1p}	β_{1N}	β_2	β_3	β_4	β_5	Adjusted R ²
$\tau=1$	0.0021 (0.08)	0.0307* (2.04)	-0.0254 (-0.63)	0.133** (3.23)	-0.629 (-3.11)	0.0363** (3.46)	0.0028 (0.92)	33.80%
$\tau=2$	-0.0513 (-1.65)	-0.0143 (-0.73)	0.00374 (0.16)	-0.0001 (-0.02)	0.0164 (1.51)	0.0076** (2.41)	0.590*** (7.06)	37.60%

Panel B. Time-series means of the cross-sectional regression coefficients from the nonlinear model														
$ROA_t = \beta_0 + \beta_{1p}DPC_0 \times DIVCH_0 + \beta_{1N}DNC_0 \times DIVCH_0 + (\gamma_1 + \gamma_2NDFED_0 + \gamma_3NDFED_0 \times ROA_0 + \gamma_4PDFED_0 \times ROA_0) \times ROA_0$ $+ (\lambda_1 + \lambda_2NCED_0 + \lambda_3NCED_0 \times CE_0 + \lambda_4PCED_0 \times CE_0) \times CE_0 + \vartheta_1 \log(MB_{-1}) + \vartheta_2SIZE_{-1} + \varepsilon_t$														
Year	β_0	β_{1p}	β_{1N}	γ_1	γ_2	γ_3	γ_4	λ_1	λ_2	λ_3	λ_4	ϑ_1	ϑ_2	Adjusted R ²
$\tau=1$	-0.043 (-1.07)	0.0012 (0.09)	-0.010 (-0.24)	0.887** (2.25)	-0.566 (-0.88)	-3.335* (-2.00)	-0.494 (-0.31)	0.0911 (0.19)	-0.723 (-0.88)	-3.872 (-1.37)	-1.562 (-0.30)	0.0204* (1.96)	0.0042 (0.85)	41.20%
$\tau=2$	0.0250 (0.52)	-0.0196 (-1.07)	-0.0289 (-0.74)	0.688** (3.33)	0.640 (1.06)	7.683 (1.21)	0.311 (0.24)	-0.294 (-0.58)	0.767 (1.32)	0.422 (0.16)	-0.0510 (-0.01)	0.0146 (1.05)	-0.0001 (-0.01)	40.50%

Note. This table reports regressions output relating ROA levels to dividend changes. ROA_t is operating income divided by the total assets at the end of year t . $DIVCH_0$ is the annual change in the cash dividend in year 0. $DPC_0(DNC_0)$ is a dummy variable that takes the value of 1 for dividend increases (decreases) and 0 otherwise. CE_0 is $ROA_0 - ROA_{-1}$. $NDFED_0$ is a dummy variable that takes the value of 1 if ROA_0 is negative and 0 otherwise. $PDFED_0$ is a dummy variable that takes the value of 1 if ROA_0 is positive and 0 otherwise. $NDFED_0$ is a dummy variable that takes the value of 1 if CE_0 is negative and 0 otherwise. $PCED_0$ is a dummy variable that takes the value of 1 if CE_0 is positive and 0 otherwise. $\log(MB_{-1})$ is the logarithm of the market-to-book ratio of equity in year -1. $SIZE_{-1}$ is the logarithm of total assets in year -1. The numbers in parentheses are t-statistics computed using White's (1980) heteroskedasticity consistent standard errors. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

Overall, our analyses provide no support for the signalling theory. Specifically, the results indicate that dividend changes are only significantly related to current changes in profitability. Hence, our results stand in contrast to the earlier studies of Nissim and Ziv (2001) in the US, where they find evidence of the signalling theory, and Aggarwal *et al.* (2012), where they detect that dividend changes are informative about future profitability in a poor information environment. Our results are consistent with Grullon *et al.* (2005), who find strong evidence against the signalling hypothesis. Furthermore, the findings are consistent with the tax-based signalling hypothesis.

3.6.3 Determination of dividend changes

We turn our analysis to investigate factors that affect the amount of dividend changes in Omani firms. We include several potential explanatory variables, similar to the previous studies (e.g., Fama and French, 2001; Denis and Osobov, 2008). The dependent variables are: (1) all dividend changes, (2) dividend increases and (3) dividend decreases. The explanatory variables are current and past change in profitability (EDBV and ECHG), size, age, growth, market to book ratio, leverage, dividend yield and current and past change in retained earnings. We control for industry and year fixed effects in all regressions.

$$\begin{aligned} DIVCH_{0,t} = & \beta_0 + \beta_1 PROFCHG_t + \beta_2 SIZE_{-1} + \beta_3 Growth_{-1} + \beta_4 MB_{-1} + \beta_5 Lev_{-1} \\ & + \beta_6 YLD_{-1} + \beta_7 AGE_{-1} + \beta_8 RETACHG_0 + \beta_8 RETACHG_{-1} + \varepsilon_t \end{aligned} \quad (3.12)$$

The results of the regressions of dividend changes (DIVCHG) on past and current profitability changes are presented in Models 1 and 2 of Table 3.12. Our results show that the coefficients of past and current profitability measures are positive and highly significant at the 1% level, indicating a strong association between the magnitude of dividend changes, and current and past profitability changes in Omani firms. Firm size is found to be negative and insignificantly correlated with the amount of dividend changes: this is in line with Fairchild *et al.* (2014) for Thailand.

The coefficients of *Growth* (as a measure of firm's current investment) are positive and significant at 5% level in Model 2 when using changes in earnings (ECGH) as a measure of profitability. The results further indicate that market to book ratio (M/B) and age are insignificantly correlated with the magnitude of dividend changes in Oman: this stands in sharp contrast to the findings in developed markets (e.g., Fama and French, 2001; Aggarwal *et al.*, 2012). These findings do not support the notion that firms with better investment opportunities reduce the magnitude of dividends to fund their investments. A possible explanation is that

Omani firms can easily finance their investments through banks (as noted by Al-Yahyaee *et al.*, 2011) which reduces the importance of internal funds to finance new investments. Further, the results also provide no evidence on the life cycle theory, as the coefficient of both market to book ratio and age are statistically insignificant (Grullon and Michaely, 2002; DeAngelo *et al.*, 2006).

Furthermore, the estimated coefficients of leverage in Models 1 and 2 are positive and significant, suggesting that firms with high leverage increase the amount of dividend changes. This finding rules out the importance of leverage in mitigating the agency problem: this stands in sharp contrast to the earlier studies in developed countries (e.g., Margaritis and Psillaki, 2010). The negative coefficients of dividend yield are statistically and economically significant at 1% level indicating dividend stability in Oman which is in line with Al-Yahyaee *et al.* (2010). Moreover, we find insignificant association between dividend changes and current and past RETA changes. These findings contradict the free cash flow hypothesis where firms tend to pay high dividends when they have high accumulated profit.

Models 3 and 4 of Table 3.12 present the estimated results of dividend increasing firms. Both measures of profitability demonstrate the importance of current and past profitability in determining the amount of dividend increases in Oman. The coefficients of firm size are negative and insignificant in Models 3 and 4, suggesting that firm's size is not considered as a factor that determinates the magnitude of dividend increases in Oman. Similar to our findings in Models 1 and 2, we detect a positive (negative) association between leverage (dividend yield) and the amount of dividend increases. The former indicates the diminished role of leverage to reduce the agency problem. The latter suggests dividend stability in Oman. That is firms with high dividend yield negatively impact the magnitude of dividend increases (as in Model 4). We also find a significant relationship between firms' age and dividend increases which is in line with the life cycle theory. The remainder of the control variables are insignificantly correlated with the amount of dividend increases, which is similar to our findings in Models 1 and 2.

The results from investigating the association between the magnitude of dividend decreases and potential explanatory variables are presented in Table 3.12 Models 5 and 6. The findings reveal that current profitability measures (EDBV and ECHG) are negatively related to the amount of dividend decreases as stated in Models 5 and 6. Past profitability coefficients are negative and only significant in Model 5.

The coefficient of size is positive and statistically insignificant, which suggests that firm size is not associated with the magnitude of dividend decreases in Oman. Unlike our findings in

Models 1 to 4, we find a positive association between changes in current retained earnings and the amount of dividend decreases. This finding indicates that when firms retain more profit in the current year, they pay lower dividends and vice versa.

Table 3.12. Factors affecting dividend changes

Dependent variables	DIVCHG		DIVINC		DIVDEC	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.0697 (-0.17)	0.196 (0.45)	-0.347 (-0.77)	-0.203 (-0.41)	-0.864 (-1.05)	0.291 (0.40)
<i>EDBV</i> ₀	6.415*** (4.66)		3.165* (1.97)		-4.922*** (-3.73)	
<i>EDBV</i> ₋₁	3.788** (2.25)		4.365** (2.34)		-3.658* (-1.90)	
<i>ECHG</i> ₀		0.349*** (2.76)		0.193* (1.77)		-0.276*** (-3.55)
<i>ECHG</i> ₋₁		0.917*** (3.66)		1.135*** (3.83)		-0.787 (-1.58)
Size	-0.0205 (-0.76)	-0.0467 (-1.59)	-0.0266 (-0.73)	-0.0284 (-0.79)	0.0212 (0.59)	0.0424 (0.97)
Growth	0.310 (1.50)	0.509** (2.11)	0.206 (0.86)	0.366 (1.41)	0.537 (1.70)	0.313 (1.27)
M/B	-0.0482 (-1.35)	-0.00514 (-0.13)	-0.0552 (-1.30)	-0.00295 (-0.06)	0.0264 (0.73)	0.0509 (1.44)
Lev	0.553*** (2.63)	0.432* (1.85)	0.826*** (3.20)	0.772*** (2.82)	0.247 (1.26)	-0.263 (-0.99)
YLD	-3.458** (-2.32)	-3.474*** (-3.35)	-2.474 (-1.38)	-3.004** (-2.26)	2.491 (1.40)	0.184 (0.17)
Age	0.116 (1.14)	0.0737 (0.73)	0.208* (1.92)	0.160 (1.47)	0.102 (0.78)	-0.114 (-0.90)
RETACHG	-1.220 (-1.26)	-0.499 (-0.51)	-0.651 (-0.45)	-0.0643 (-0.05)	1.030** (2.28)	1.294*** (3.30)
<i>RETACHG</i> ₋₁	-0.810 (-0.96)	0.101 (0.24)	-1.218 (-1.32)	-0.0137 (-0.03)	0.667 (0.85)	0.103 (0.29)
Year & Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	599	599	356	356	245	245
R ²	0.289	0.26	0.203	0.217	0.384	0.348
Adj. R ²	0.235	0.197	0.111	0.122	0.202	0.095
Prob > F	0.000	0.000	0.001	0.008	0.000	0.003

Note. This table reports the estimated outputs regarding the determinants of all dividends changes (DIVCHG), dividend increases (DIVINC) and dividend decreases (DIVDEC), considering current and past profitability and other explanatory variables. All variables are defined in Table 3.1. The figures in parentheses are the t-statistics. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

3.6.4 The propensity to change dividends

To get a further insight, this section examines how current and past profitability, and other control variables used in Eq. (3.12), influence the likelihood of dividend changes, dividend increases and dividend decreases. We run logistic regressions using Eq. (3.12) where the explanatory variables are (1) a dichotomous variable that is equal to one if the firm change its dividend and 0 otherwise; (2) a dichotomous variable that is equal to one for dividend increases firms and 0 otherwise; and (3) a dichotomous variable that is equal to one for dividend increasing firms and 0 otherwise. Our study sample incorporates firms that do not change their dividends: this increases the number of observation to 716.²³ We control for industry and year fixed effects in all regressions.

The estimated outputs of the logistic regression are presented in Table 3.13 Models 1 to 6. The coefficients in Models 1 and 2 are positive and significant at 1% level for both current profitability measures. The lagged profitability measures are positive and only significant in Model 2. These findings suggest that current profitability increases the likelihood of changes in dividends in the same direction. We also obtain similar results for dividend increases (Models 3 and 4). These findings are in line with earlier studies in developed markets (e.g., Harada and Nguyen, 2005; Aggarwal *et al.*, 2012) and in developing markets (e.g., Fairchild *et al.*, 2014).

The coefficients of size are found to be positive and significant in Models 1 to 4 which indicates that the likelihood of dividend changes and increases are more likely to occur amongst larger firms in the Omani market, which is in line with the results obtained by Aggarwal *et al.* (2012) for cross-listed firms in the US and inconsistent with those obtained by Fairchild *et al.* (2014) for Thailand.

In contrast to the findings in developed countries (e.g., Aggarwal *et al.*, 2012), market to book ratio (M/B) (a proxy for future investment opportunities) has significant positive coefficients in Models 1 and 2. However, this association is eliminated in the case of dividend increases (as in Models 3 and 4) indicating that future investments do not impact the propensity of firms to increase dividends which is in line with the recent study in Thailand (Fairchild *et al.*, 2014).

Furthermore, the leverage's coefficients are negative and significant in Models 1 to 4. These findings indicate that firms with less leverage are more likely to change or increase dividends: this is similar to the results obtained by Aggarwal *et al.* (2012) in developed markets. Moreover, we find that dividend yield decreases the likelihood of firms to change and increase dividends

²³ We include 152 observations in our regressions that reflect firms that do not change their dividends.

as stated in Models 1 to 4 which may be attributed to the dividend stability in Oman. The estimated coefficients of current change in retain earnings (RETACHG) are negative and significant in Models 1 and 3. These findings suggest that when firms retain more profit from current year they are less likely to change or increase dividends (consistent the empirical findings of Fairchild *et al.*, 2014).

The regressions for the effect of firms' characteristics on the propensity of firms to decrease dividends are presented in Models 5 and 6 of Table 3.13. The results show that current profitability measures are negative and highly significant at 1% level. However, the coefficients of past profitability measures turn out to be insignificant in Model 5 and positively significant in Model 6.

These findings suggest that firms' current, but not past, profitability is likely to determine the reduction in dividends amongst Omani firms. This findings stand in sharp contrast to the recent work of Fairchild *et al.* (2014) where they show that both current and past performance influence firms' decisions to reduce dividends. Firm size appears to be insignificantly correlated with the probability of firms to cut dividends as revealed in Models 5 and 6.

The coefficients of current investment opportunities (Growth) are negative and significant at the 10% level: this indicates that firms with high current investments are less likely to reduce dividends (inconsistent the empirical findings of Fairchild *et al.*, 2014).

The results further indicate that firms with high future investment opportunities (M/B) are more likely to cut dividends. This finding could be interpreted as follows: those firms need capital for future investments and hence they reduce dividends. The dividend yield for dividend-decreasing firms is negative and significant at 1% level, indicating the dividend stability is important for those firms. Additionally, we find that firms' age is positively significant which suggest that mature firms are more likely to decrease dividends. Overall these findings suggest that there is little evidence of the life-cycle theory proposed by Fama and French (2001), Grullon and Michaely (2002) and DeAngelo *et al.* (2006).

In sum we find that factors that influencing the probability of firms to change and increase dividends are very similar. However, they are differ from the factors that affect the likelihood of firms to cut dividends. Aggarwal *et al.* (2012) find that informational factors are (are not) significantly correlated with dividend increases (decreases). Similarly, Fairchild *et al.* (2014)

demonstrate that the firm characteristics that effect the likelihood of increases and decreases dividends are not exactly the same.²⁴

Table 3.13. The propensity to changes dividends

Dependent variables	DIVCHG		DIVINC		DIVDEC	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-6.000*** (-4.13)	-5.275*** (-3.92)	-5.027*** (-4.00)	-4.027*** (-3.38)	-11.42*** (-5.45)	-9.905*** (-5.51)
<i>EDBV</i> ₀	5.095*** (2.92)		8.931*** (4.62)		-13.13*** (-4.75)	
<i>EDBV</i> ₋₁	3.034 (1.21)		2.703 (1.46)		-1.297 (-0.42)	
<i>ECHG</i> ₀		0.0948** (2.18)		0.0833** (2.32)		-0.133** (-2.46)
<i>ECHG</i> ₋₁		2.436*** (3.27)		1.263** (2.02)		1.289** (2.14)
Size	0.443*** (2.79)	0.388*** (2.61)	0.357*** (3.40)	0.286*** (2.85)	0.567 (1.42)	0.432 (1.23)
Growth	-0.455 (-0.95)	-0.280 (-0.58)	0.0776 (0.17)	0.123 (0.27)	-3.572* (-1.93)	-3.334* (-1.90)
M/B	0.324* (2.21)	0.335* (1.96)	0.275 (0.67)	0.253 (0.86)	0.300** (2.10)	0.278* (1.87)
Lev	-2.233*** (-2.96)	-1.870** (-2.56)	-2.330*** (-4.09)	-2.045*** (-3.77)	0.136 (0.16)	0.573 (0.67)
YLD	-19.37** (-2.32)	-15.91* (-1.91)	-9.115* (-1.91)	-6.880** (-2.04)	11.52*** (3.47)	10.60*** (3.82)
Age	0.476* (1.68)	0.408 (1.49)	0.186 (0.67)	0.0938 (0.35)	1.188*** (2.85)	1.075*** (2.70)
RETACHG	-1.127** (-2.48)	-0.344 (-0.77)	-1.548*** (-2.75)	0.356 (0.84)	0.557 (0.73)	0.0301 (0.05)
<i>RETACHG</i> ₋₁	-0.501 (-1.11)	-0.733 (-1.63)	-0.279 (-0.69)	-0.233 (-0.54)	-0.432 (-0.48)	-0.370 (-0.49)
Year & Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	751	751	751	751	751	751
Pseudo R ²	0.293	0.311	0.194	0.171	0.274	0.227
Prob>chi	0.000	0.000	0.000	0.000	0.000	0.000

Note. This table reports the outputs of logistic regressions. The dependent variables are DIVCHG (=1 if firms pay dividends; 0 otherwise); DIVINC (=1 if dividends are increased; 0 otherwise); and DIVDEC (=1 if dividends are decreased; 0 otherwise). All explanatory variables are defined in Table 3.1. The figures in parentheses are the z-statistics. *, **, *** indicates significance levels at 10%, 5% and 1%, respectively.

²⁴ For example, Fairchild *et al.* (2014) find that cash flow and change in retained earnings are significantly related to the propensity of firms to increase dividends in Thailand. However, these variables turn out to be insignificant to the likelihood of decreasing dividends.

3.7 Conclusion

Our study explores the information content of dividend changes in Oman by examining the relationship between different types of dividend changes and past, current and future profitability. Prior research suggests that dividend changes convey information about firms' prospects, and that a signal has to be costly to be of any value (Black, 1976; Bhattacharya, 1979). However, the empirical results on the association between dividend changes and future profitability are inconclusive. Further, the earlier study of Aggarwal *et al.* (2012) argued that, in a poor information environment, firms have more incentive to use dividend changes to convey information about future profitability. We re-examine these arguments using data from an emerging market with unique market idiosyncrasies.

In this study we investigate the relation between dividend changes and future earnings changes in Oman, using multiple methods from earlier studies. Thus, our work complements Al-Yahyaee *et al.*'s (2011) study on dividend announcements and *stock market reaction* in Oman, where they find strong support for the signalling theory of dividends. Our initial results find very little support for the information content of dividend in relation to *future profitability*. Specifically, we find evidence of the information content of dividend for only one year following dividend decreases. Our findings provide a sharp contrast with the recent study of Aggarwal *et al.* (2012) where they detect that firms have more incentive to use dividend increases to signal their future prospects in a poor information environment.

However, using a more appropriate method of estimating the expected earnings, the nonlinear approach, we provide no support for the signalling theory. These results suggest that in Oman where there is no tax on dividends, dividend changes are not informative about future profitability which is consistent with the tax signalling hypothesis (Black, 1976). Another explanation of why dividend changes do not signal future profitability might be attributed to the high ownership concentration and high leverage amongst listed firms in Oman (Jensen, 1986).

We further study the factors that affect the magnitude of dividend changes in Oman. Our results show that past and current profitability changes are the most important factors that drive the amount of dividend changes, increases and decreases. The results also demonstrate that dividend changes and increases are affected by dividend yield (consistent with Al-Yahyaee *et al.*, 2010) and leverage. However, these factors appear to have no impact on the magnitude of dividend decreases. Moreover, our findings provide no support for the life cycle theory where firms at later stages have more incentive to distribute dividends (Grullon and Michaely, 2002; DeAngelo and DeAngelo, 2006).

The association between firms' characteristics and the propensity to change, increase and decrease dividends are also examined: this affirms that current and past profitability affect the likelihood to do so. A firm's size increases the propensity of firms to change and increase dividends, while leverage, dividend yield and current change in retained earnings reduce the propensity of firms to do so.

Our study contributes to the literature by providing evidence on the tax-based signalling hypothesis. In addition, our findings reveal no evidence on the use of dividend increases to convey information about future profitability in a poor information environment. Furthermore, our conclusion on the strong relationship between dividend changes and current profitability changes enable us to understand the reason behind the highly frequent changes of dividend policy in Oman. Thus, our study provides practical implications for managers, investors as well as practitioners with regard to the announcement of dividend changes in Oman.

Future research may extend the analysis to explore the contrast between the relationship between dividends and stock price reactions, and dividends and profitability, as an interesting, and under-researched area. Particularly, it is interesting to ask why stock prices react so strongly to dividend announcements in Oman (i.e., Al-Yahyaee et al.'s (2011) evidence) when dividends provide little information about future profitability in the same corporations (i.e., our evidence). Could this be evidence of investor irrationality (that is, investors have been conditioned to believe that dividend increases are good news, and hence, the stock market reacts accordingly)? This would be consistent with the dividend catering theory in which firms cater to investors' (irrational) demands for dividends by paying out when investors place a premium on dividend paying stocks.²⁵

We suggest that, for future research, scholars extend this comparison between dividends, earnings and stock price reaction to other countries around the world. For example, there is considerable evidence in favour of the signalling hypothesis in relation to stock market reaction in the US (that is, evidence of a positive relationship between dividend changes and stock prices) but the evidence on the relationship between dividend changes and earnings is mixed. As suggested in this section, it would be interesting to consider why.

²⁵ Indeed, I am personally acquainted with an Omani company where the institutional investors have consistently been demanding 100% dividend payout ratios in recent years, despite the firm having good, value-adding investment opportunities available. The CEO has opined that the firm will be in trouble if it does not cut the dividend in order to invest in growth. This can be considered in the dividend catering framework, and demonstrates the dangers of catering to the short-run market reaction (dividend signalling).

Chapter 4: Dividend Policy, Overconfidence and Moral Hazard²⁶

4.1 Introduction

Behavioural corporate finance examines the effects of managerial psychological biases on corporate finance decision-making (investment appraisal, capital structure, and dividend policy). A particular bias that has been analysed is that of managerial overconfidence. Much of the work has focussed on the effect of this managerial bias on investment appraisal (managerial overconfidence has been demonstrated to increase investment into higher-risk and value-reducing projects) and capital structure (it has been observed that managerial overconfidence may result in higher corporate debt levels).

Recently, there has been emerging research on the effects of managerial overconfidence on *dividend policy*. This area of enquiry has produced mixed theoretical and empirical results. Some scholars argue that managerial overconfidence and dividends should be negatively related (e.g., Ben-David *et al.*, 2007; Cordeiro, 2009; Deshmukh *et al.*, 2013). However, Wu and Liu (2008) argue that overconfidence and dividends may be positively related.

Ben-David *et al.* (2007) argue that overconfident CEOs are less likely to pay dividends. Deshmukh *et al.*, (2013) provide a model that explains the negative relationship between overconfidence and dividends. In their model they show that because overconfident managers view external finance costly and believe their firms to be undervalued by the market, they reduce dividends in order to have sufficient cash flow to invest in future projects. In contrast, Wu and Liu (2008) provide a model that demonstrates precisely the opposite result. More specifically, they show that because an overconfident manager overestimates his ability to maintain transitory earnings, he pays more dividends. However, none of these studies consider the impact of agency costs on the relationship between managerial overconfidence and dividend policy.

In this chapter, we contribute to this research area by developing a model of managerial overconfidence and dividend policy that takes moral hazard into account. We demonstrate that overconfidence can lead to higher dividends (when the manager is overconfident about his current ability) or lower dividends (when the manager is overconfident about his future ability). We also demonstrate that higher overconfidence may result in an increase or a decrease in firm

²⁶ I would like to thank the Young Finance Scholars' Conference and Quantitative Finance Workshop (2014) participants at the University of Sussex, Brighton, UK; and the South West Accounting Group, BAFA (2013) participants at the University of Gloucestershire, Cheltenham, UK, for their comments and suggestions. Any errors are our own.

value. Furthermore, we show that managerial bounded rationality could have an effect on this relation.

In Behavioural corporate finance, there has been much work analysing the effects of managerial overconfidence on capital budgeting (investment appraisal) and capital structure (financing) decisions. In contrast, the research on managerial overconfidence and dividends is recently emerging, and little understood. Our model thus contributes to this area of research.

The existing research on overconfidence in behavioural corporate finance demonstrates ambiguous results. In capital budgeting, overconfidence may be bad, since it may results in excessive risk-taking. However, Gervais et al., (2003) demonstrate that it may be beneficial in offsetting managerial risk aversion (risk-aversion leads to managers taking insufficient risk from the viewpoints of investors; overconfidence may counteract this). In terms of capital structure, Fairchild (2005) demonstrates that managerial overconfidence may lead to higher debt, but the effect on firm value is ambiguous (overconfidence may be seen as bad, since it leads too much debt, which increases expected financial distress). However, overconfidence also drives higher effort. Thus, the effect of overconfidence on firm value depends on the trade-off between high debt/ higher expected financial distress and higher effort. Further, Fairchild (2009) demonstrates that high overconfidence may actually lead to lower debt as the overconfident manager may overestimate the value of the future project, and hence requires higher current cash flow.

Our work contributes to the emerging research on the relationship between managerial overconfidence, dividends and firm value. Whereas the research suggests a positive relationship between debt and overconfidence, the relationship between dividends and overconfidence is less clear. Wu and Liu (2008) suggest a positive relationship, however, Deshmukh et al., (2013) suggest a negative relationship. Furthermore, Bouwman (2009) suggests the relationship between dividends, overconfidence, and value may be ambiguous.

Our models aim to address this by examining the conditions under which managerial overconfidence, dividends and firm value may be positive or negative. Furthermore, our models incorporate moral hazard, in terms of managerial effort shirking, and the potential for the manager to choose negative NPV projects, due to private benefits. Moreover, this chapter extends the analyses by examining the effect of managers' and investors' bounded rationality on the relationship between overconfidence and dividend policy.

The intuition behind our models is as follows. In our first model, the overconfident manager exerts effort on a current project, and hopes to be able to take a future project, due to the associated private benefits. Moral hazard exists in the form of effort shirking on the current

project. The manager happens to be rewarded on current share price, and hence wishes to commit to a high effort on current project to boost current share price. The way that he makes this commitment to high effort is to announce a sufficiently high dividend. Therefore, he must work hard to generate sufficient expected cash flow from the current project to be able to invest in the new project and pay dividends. Therefore, the more overconfident he is, the higher the dividend. The effect of overconfidence and high dividend, on firm value, however, is ambiguous and depends on his true ability.

In the second model, the overconfident CEO exerts effort only in the future project and hopes to take the future project to be able to obtain the associated private benefits in case of the future project success. Therefore, this leads the overconfident manager to reduce dividends in order to have sufficient cash flow to invest in the future project. The free cash flow problem (Jensen, 1986) exists, since the overconfident manager might invest in negative a NPV project due to his upward assessment of his ability to affect the success of future project. Again, the relationship between overconfidence, dividends and firm value is ambiguous.

The final model presents a bounded rationality case where the manager does not fully understand the conditions surrounding the dividend announcement (he does not know if he is in Model 1 or 2). Therefore, the manager calculates his expected payoff based on probability of each model. Similarly, investors face the same problem of not understanding the reason for the dividend announcement and assign different weights to each outcome.

This chapter is organised as follows. The first section discusses the difference between optimism and overconfidence. The following section presents our model. Section 4.4 presents the first model where the manager is overconfident about his current ability. The second model that is reported in section 4.5 analyses the case where the manager is overconfident about his future ability. The impact of manager and investor bounded rationality is stated in section 4.6. Each of these sections is followed by numerical example.

4.2 Optimism vs. overconfidence

The economic and psychology literatures show that optimism and overconfidence are characteristic traits of human beings. These literatures view optimism as generalized positive expectations about future events (Scheier and Carver, 1985; Scheier et al., 1994; Puri and Robinson, 2007). It is more related to overestimation of exogenous outcomes such as economic growth (Malmendier and Tate, 2005).

The psychology literature distinguishes between three types of overconfidence: (i) the tendency to overestimate human ability (better than the average), (ii) to believe that they have more

control over events than it is in reality (illusion of control); (iii) and to think that their knowledge is more accurate than it really is (miscalibration) (De Paola et al., 2014).

Despite the relevant role of optimism and overconfidence in corporate financial policies, there is no uniform definition of these terms in the behavioral corporate finance literature. For example, Heaton (2002) states that optimistic managers overestimate (underestimate) the probability of good (bad) future performance of their firms. His theoretical model incorporates managerial optimism in the form of overestimating the probability of future project success and underestimating the probability of failure.

A study of Ben-David et al. (2007) refers to an optimistic manager as one who overestimates his firm's future cash flow while Malmendier et al. (2011) use this definition to define overconfident managers. Ben-David et al. (2007) employee miscalibration, i.e. underestimation of the volatility of future cash flow by managers, to define overconfidence. The recent works of Gervais et al. (2011) and Deshmukh et al. (2013) theoretically attach overconfidence to a manager who overestimates of the private signal relative to public information.

Apparently, discussions of optimism and overconfidence have tended to be context dependent in behavioral corporate finance literature, and defined in the empirical studies using, in most cases, the exact proxies such as CEO unexercised option moneyness, survey and media press to define the psychological biases of managers: optimism or overconfidence. Malmendier and Tate (2005,a) use unexercised in the money options by CEOs to measure overconfidence while Campbell et al (2011) use the same definition to term optimism.

Brown (2012) states that the two terms: optimism and overconfidence, are the same in cases where future events depend on an individual's current actions. According to Malmendier and Tate (2005, p2662): "Upward bias in the assessment of future outcome is sometime referred to as "overoptimism" rather than "overconfident". We follow the literature on self-serving attribution and choose the label "overconfident" in order to distinguish the overestimation of one's own ability (such as IQ or managerial skills) and outcomes relating to one's own personal situation from the general overestimation of exogenous outcomes."

A very recent study by Pikulina et al (2014) use individual belief about his ability to measure overconfidence. Their results reveal that people who overestimate their ability to be higher than it actually is, exert more effort. In this study the term overconfidence stems from "better the average" effects, and is defined as an overestimation of individual ability relative to the average ability level in the economy (Van den Steen, 2011; Fast et al., 2012). Specifically, an overconfident manager is defined as the one who overestimates his ability to affect the success

of current/future project(s). This will drive overconfident manager to exert higher effort than rational peers (similar to Gervais et al. (2011)).

4.3 The Model

We consider a self-interested risk-neutral corporate manager who exerts effort in running a current project. At the same time, a new project becomes available. Hence, we consider two possible moral hazard problems: managerial effort-shirking on the current project, and possible free cash-flow problems if the future project is negative NPV (see Jensen, 1986).

The manager is rewarded based on current market value (short-term-compensation scheme). We consider the impact of managerial overconfidence.

The manager is currently deciding on his firm's dividend policy (specifically, he is deciding whether to announce a low or high dividend). The dividend level affects his ability to take the new project. In our model, he may decide to choose to announce a high dividend as a commitment to exert high effort on the current project.

We consider two different versions of the model. In the first version, the manager is overconfident about his ability to affect the success of the current project. Furthermore, the second project unambiguously has a positive NPV. In the second version, the manager is overconfident about his ability to affect the success of the future project, if taken. We demonstrate that this difference between the manager's overconfidence (about the present or the future) crucially affects the relationship between overconfidence and dividends. In the former case (overconfidence about the present) it is positive (there is a critical level of overconfidence at which the manager increases dividends: to commit to higher current effort). In the latter case (overconfidence about the future), it is negative (there is a critical level of overconfidence at which the manager decreases dividends: in order to be able to take the second project, which may, or may not, be positive NPV).

Note that in the first model, we consider a commitment problem over the manager's effort level. The manager is rewarded on current share price. Furthermore, the market "sets" the current value of the firm, and then the manager subsequently exerts unobservable (and hence non-monitored) effort. Since the manager is rewarded on current share price, before he exerts efforts, he would like to promise the investors high effort. So thus the investors would pay high current price. However, the investors pay, and then the manager exerts effort. Hence, if the dividend is low, such that the manager can take the new project regardless of realisation of current project. Then, once he has received his compensation from the investors, it is optimal for him to then exert zero effort. This is the nature of the commitment problem in relation to

moral hazard. Hence, the manager may wish to use the dividends to commit to high effort, so that investors pay more today.²⁷

In the second model, the manager continuous to be rewarded on short-term share value but now he may need cash flow to invest in a future project. Hence, now overconfidence may lead to him reducing the current dividend level. The next section analyses Model One in more detail.

4.4 Model 1: Manager is overconfident about current ability: second project has positive NPV.

The timeline of the game is as follows.

Date 0: The firm has a current project in place (project 1). Also, a new future project appears (project 2). This project will be available at date 2, and will require investment $I > 0$. At date 0, the manager makes a dividend announcement. The market observes the announcement and values the firm accordingly. The manager receives compensation. Since the manager receives compensation first and then exerts (unobservable) effort, therefore, there is a commitment problem. The manager may then use dividends as a commitment to high effort.

Date 1: The manager runs the firm's current project (project 1). This project is risky (facing two possible outcomes): it may succeed in the future (with probability $p_1 \in [0,1]$), in which case it provides income $R_H > 0$. Alternatively, it may fail with probability $(1 - p_1)$ in which case, it provides income R_L , where $R_H > R_L > 0$. The manager exerts effort e_1 into project 1, and faces cost of effort²⁸ (ce_1^2). Managerial effort affects the probability of success as follows: $p_1 = \gamma_1 e_1$, where γ_1 represents managerial ability. An overconfident manager believes that his ability is $\hat{\gamma}_1$, where $\hat{\gamma}_1 > \gamma_1$. A rational, well-calibrated manager understands his true ability: that is, for a rational manager, $\hat{\gamma}_1 = \gamma_1$.

Date 2: The manager pays the dividend announced at date 0, and then invests the required I into the new project if these funds are available for the remaining cash flow after paying the dividend. If taken, the new project succeeds with exogenously given probability, $p_2 \in [0,1]$, in

²⁷ Grossman and Hart (1982) look at this commitment in terms of debt: high debt commits the manager to high effort due to bankruptcy threat. In our model, high dividends commits him to higher effort in order to increase the probability of being able to take the new project.

²⁸ Since investors have already compensated the manager effort is only driven by his ability in generating sufficient cash flow to take future project. If dividend is low he can take project regardless of cash flow. If dividend is high, he cannot take it regardless of cash flow. In either case (high and low dividends), I demonstrate that this optimal effort is zero. in the medium dividends case, he can only take new project (achieve private benefit) in the case of success of current project. Therefore, the medium dividends commit him to a higher current effort.

which case it will provide date 3 income of $x > 0$, and it fails with probability $(1 - p_2)$ in which case it will provide income of zero. Thus, the expected cash flow is $p_2x = X$.

Also, if project two succeeds, it gives manager date 3 private benefits $b > 0$, but he gets zero private benefits in the case of failure. Thus, if the manager takes the project at date 2, his expected private benefits are $B = p_2b$.

In our current version of the model, project 2 has positive NPV: in which case, investors are happy for the manager to invest in the project.

Date 3: The game ends.

Throughout our analysis, the manager is rewarded on a short-term basis (he is myopic). His date 0 expected payoff is:

$$\hat{\Pi}_M = \alpha \bar{V}_0 + E(B) - ce_1^2 \quad (4.1)$$

Where \bar{V}_0 is the way that the market values the firm given the announcement of dividends. As he has been rewarded already at date 0, then at the effort stage, \bar{V}_0 is given. His optimisation focuses on the latter two terms (his current effort and his expected private benefit) $E(B) - ce_1^2$, where the ‘hat’ represents his perceived payoff (due to overconfidence). Moving back to date 0, the market values the firm at date 0 as follows:

$$\bar{V}_0 = \gamma_1 \bar{e}_1 (R_H - R_L) + R_L + E(N) \quad (4.2)$$

where \bar{e}_1 is the investors’ expectation of subsequent effort

Furthermore, in Eq. (4.2) $E(N)$ is the expected net present value of the new project. Therefore, the manager’s choice of dividend announcement will affect the market’s date 0 valuation \bar{V}_0 , due to two reasons. First, his dividend announcement will affect his ability to take project 2. Second, it may affect his optimal effort in project 1. For example, a high dividend may commit him to a higher effort, which will then result in the market providing a higher date 0 valuation \bar{V}_0 .

We solve by backward induction. First, we consider the manager’s project 2 decision at date 2, given the realisation of project 1’s income (recalling that the probability of project 1 success is affected by the manager’s date 1 effort). Then we move back to date 1 to solve for the manager’s date 1 effort decision, given the date 0 dividend announcement. Finally, we move back to date 0 to solve for the manager’s optimal date 0 dividend announcement.

4.4.1 Date 2 Project 2 decision

We first take as given the cash flow achieved at date 1, and consider the manager's decision to invest in new project.

We consider three possible levels for the manager's date 0 announcement as follows:

4.4.1.1 In the case of low dividend announcement, $D_L < R_L - I$

In this case, the manager will be able to pay the dividend and invest in the new project regardless of the date 1 realisation of project 1's income (thus, in Eq. (4.1), $E(B) = B$ regardless of effort).

4.4.1.2 In the case of medium dividend announcement, $D_M \in (R_L - I, R_H - I]$

Given the medium dividend announcement, the manager will only be able to invest, after paying the dividend, in the good state of project 1 $E(B) = p_1 B = \gamma_1 e_1 B$.

4.4.1.3 In the case of high dividend announcement, $D_H > R_H - I$.

Within the dividend announcement, the manager will not be able to pay the dividend and invest in the new project, regardless of the date 1 realisation of project 1's income $E(B) = 0$.

Obviously, we do not need to consider the manager's decision (whether to take new project or not) in the case where he cannot take the new project (medium dividend, with bad state realisation of project 1, or high dividend, with either realisation).

We therefore focus on the case where the manager can invest in the new project (low dividend, with either realisation of project 1, or medium dividend, with high realisation of project 1).

Lemma 1: *Since the manager is myopic, receiving his monetary reward at date 0, he will invest in the new project if he can, regardless of whether it is value-increasing ($X \geq I$) or value-reducing ($X < I$), since he obtains private benefits $B > 0$ from the new project. Hence, in the case that ($X < I$), I face the Jensen's free cash flow problem (not a problem in this version, but a problem in our second version).*

4.4.2 Date 1 effort level

Having established that the manager will invest in the new project at date 2 if he can, we now move back to date 1 to consider the manager's optimal effort level, given his date 0 dividend decision.

4.4.2.1 In the case of low dividend announcement, $D_L < R_L - I$

First, we take as given that the manager chose $D_L < R_L - I$ at date 0. Therefore, the manager will be able to invest in the new project at date 2, regardless of the realisation of project 1's income. Note that, the only factor driving managerial effort is his desire to take the second project at date 2 (given he has been already received his compensation from the investors before he exerts effort: commitment problem). There is a moral hazard problem. The market values the project, and then the manager exerts (unobservable) effort. Hence, since he can take the new project regardless of effort, his optimal date 0 effort level is $e_1^* = 0$, because effort is costly.

Formally, when $D_L < R_L - I$, the manager's date 1 payoff is

$$\hat{\Pi}_M^L = \alpha \bar{V}_0 + B - ce_1^2, \text{ where } \bar{V}_0 = \gamma_1 \bar{e}_1 (R_H - R_L + X - I) + R_L.$$

It is easy to observe that $\frac{\partial \hat{\Pi}_M^L}{\partial e_1} < 0, \forall e$.

\therefore Optimal effort is $e_1^* = 0$.

Initiatively, the manager has already been compensated by the market ($\alpha \bar{V}_0$) and now he exerts effort. He can take the second project regardless of date 1 income realisation. Thus, he does not need to exert any effort in the current project.

Hence, date 0 firm value (from Eq. (4.2)) becomes:

$$\bar{V}_0 = R_L + X - I. \quad (4.3)$$

Therefore, his date 1 expected payoff becomes:

$$\hat{\Pi}_M^L = \alpha [R_L + X - I] + B \quad (4.4)$$

4.4.2.2 In the case of high dividend announcement

Here we consider the case where the manager chose $D_H > R_H - I$ at date 0. In this case, he will be *unable* to invest in the new project at date 2, regardless of the realisation of project 1's income. Therefore, again, his optimal effort level is $e_1^* = 0$.

Formally, when $D_H > R_H - I$

The manager's date 1 expected payoff is

$$\hat{\Pi}_M^H = \alpha \bar{V}_0 - ce_1^2, \text{ again } \frac{\partial \hat{\Pi}_M^H}{\partial e_1} < 0, \forall e.$$

\therefore Optimal effort is $e_1^* = 0$.

Intuitively, again manager already paid. Cannot take new project regardless of the realisation.

Now, the firm value becomes:

$$\bar{V}_0 = R_L. \quad (4.5)$$

Therefore, his date 1 expected payoff becomes:

$$\hat{\Pi}_M^H = \alpha R_L \quad (4.6)$$

4.4.2.3 In the case of medium dividend announcement

Finally, consider the case where the manager chooses the medium dividend $D_M \in (R_L - I, R_H - I]$ at date 0. Now he can take the new project *only following the good realisation of project 1 at date 2*.

The manager chooses his date 1 effort level to maximise

$$\hat{\Pi}_M^M = \alpha \bar{V}_0 + \hat{\gamma}_1 e_1 B - c e_1^2 \quad (4.7)$$

Solving $\frac{\partial \hat{\Pi}_M^M}{\partial e_1} = 0$, we obtain his optimal effort level, given the medium dividend.

$$e_1^* = \frac{\hat{\gamma}_1 B}{2c} \quad (4.8)$$

Note the comparison between medium, high or low dividends. In the case of high and low dividends, it is optimal for manager to exert zero effort (since in the first case, he can take new project regardless of realisation. in the second case he cannot take new regardless of the realisation). Thus, he is only committed to exert effort with the medium dividend.

The date 0 market value of the firm is $\bar{V}_0 = \gamma_1 \bar{e}_1 (R_H - R_L + X - I) + R_L$. where \bar{e}_1 , is the investors anticipation of effort given dividend announcement.

Substituting Eq. (4.8) into this expression, I obtain

$$\bar{V}_0 = \frac{\gamma_1 \hat{\gamma}_1 B}{2c} (R_H - R_L + X - I) + R_L \quad (4.9)$$

Substituting Eq. (4.8) and (4.9) into Eq. (4.7), I obtain the manager's perceived payoff at date 0, given the medium dividend, as follows:

$$\hat{\Pi}_M^M = \alpha \left[\frac{\gamma_1 \hat{\gamma}_1 B}{2c} (R_H - R_L + X - I) + R_L \right] + \frac{\hat{\gamma}_1^2 B^2}{4c} \quad (4.10)$$

From this point on, we simplify the analysis with the following assumption. When choosing his dividend announcement, the manager is not only overconfident about his ability ($\hat{\gamma}_1 > \gamma_1$),

but he believes that the market recognises his (perceived) ability (he is overconfident about how the market will react to his announcement). Thus, he believes that the market also assigns a value of $\hat{\gamma}_1$ to his ability. Hence, replacing γ_1 with $\hat{\gamma}_1$ in Eq. (4.10), the manager's date 0 perceived payoff becomes:

$$\hat{\Pi}_M^M = \alpha \left[\frac{\hat{\gamma}_1^2 B}{2c} (R_H - R_L + X - I) + R_L \right] + \frac{\hat{\gamma}_1^2 B^2}{4c} \quad (4.11)$$

At this stage, we recognise that we need to place parameter restriction to ensure $0 \leq p_1 \leq 1$.

Recall that $p_1 = \gamma_1 e_1$, but overconfident manager perception is $\hat{p}_1 = \hat{\gamma}_1 e_1$. In the case of low and high dividend, $e_1^* = 0 \Rightarrow p_1 = \hat{p}_1 = 0$. Thus, we only need to consider medium dividend where,

$$e_1^* = \frac{\hat{\gamma}_1 B}{2c} \Rightarrow p^* = \frac{\gamma_1 \hat{\gamma}_1 B}{2c} \leq 1 \text{ and } \hat{p}_1^* = \frac{\hat{\gamma}_1^2 B}{2c} \leq 1$$

$$\therefore \text{I assume } \hat{\gamma}_1^2 \leq \frac{2c}{B} \Rightarrow \hat{\gamma}_1 \leq \hat{\gamma}_{\max} = \sqrt{\frac{2c}{B}} \quad \text{assumption (A:1)}^{29}$$

The perceive ability $\hat{\gamma}_{\max}$ is affected by c and B . If c is low (easy project), the perceive ability is low and if B is high, the perceive ability is low (that restrict the range of the perceive ability).

4.4.3 Manager's Date 0 choice of Dividend Announcement

The manager makes his date 0 dividend announcement by comparing $\hat{\Pi}_M^L$, $\hat{\Pi}_M^H$ and $\hat{\Pi}_M^M$ in Eq. (4.4), (4.6) and (4.11), respectively. First, I note that, since the new project has a positive NPV ($X - I \geq 0$) and the manager obtains private benefits $B > 0$ from the new project, $\hat{\Pi}_M^L > \hat{\Pi}_M^H$ for sure. That is, the manager will not choose the high dividend (both high and low dividends reveal to the market that the manager will exert zero effort, but under the high dividend, he is unable to take the new project, so losing the positive NPV and the private benefits). Therefore, the high dividend is dominated.

Initiatively, the manager will prefer to announce low rather than high dividend in case he does not want to use dividend to commit high effort, where only medium dividend could be used by the manager to commit for high effort.

²⁹ In a future version I will lift this restriction, and allow corner solutions.

Table 4.1: Dividend announcement, market perception of managerial effort and manager payoff following the dividend announcement

Date 0 announcement	Market knows that this commits manager to optimal date 1 effort.	Manager date 0 payoff following dividend announcement.
Low	$e_1^* = 0$	$\hat{\Pi}_M^L = \alpha \bar{V}_0 + B - ce_1^2$
Medium	$e_1^* = \frac{\hat{\gamma}_1 B}{2c}$	$\hat{\Pi}_M^M = \alpha \left[\frac{\hat{\gamma}_1^2 B}{2c} (R_H - R_L + X - I) + R_L \right] + \frac{\hat{\gamma}_1^2 B^2}{4c}$
High	$e_1^* = 0$	$\hat{\Pi}_M^H = \alpha R_L$

Therefore, the manager compares his expected payoff in the low dividend versus the medium dividend case. The manager chooses the medium dividend iff $\hat{\Pi}_M^M > \hat{\Pi}_M^L$. Defining the critical level of overconfidence $\hat{\gamma}'$ which $\hat{\Pi}_M^M = \hat{\Pi}_M^L$, I state the following:

Lemma 2: *The manager chooses the low dividend for low levels of overconfidence, such that*

$$\hat{\gamma}_1 < \hat{\gamma}' = \sqrt{\frac{4c[\alpha(X - I) + B]}{2\alpha B(R_H - R_L + X - I) + B^2}} \quad (4.12)$$

If $\hat{\gamma}_1 \geq \hat{\gamma}'$, the manager increases his dividend announcement to the medium dividend.

Next, we compare the effect of overconfidence on firm value, by comparing $V(D_L)$ and $V(D_M)$ in Eq. (4.3) and (4.9), respectively. Defining the critical level of overconfidence $\hat{\gamma}''$ at which $V(D_L) = V(D_M)$, we state the following:

Lemma 3: *Firm value is higher under the low dividend announcement (compared to the medium dividend) if*

$$\hat{\gamma}_1 < \hat{\gamma}'' = \frac{2c(X - I)}{\gamma_1 B(R_H - R_L + X - I)} \quad (4.13)$$

If $\hat{\gamma}_1 \geq \hat{\gamma}''$, firm value is higher under the medium dividend announcement (compared to the low dividend).

We note that it is ambiguous whether $\hat{\gamma}' \geq \hat{\gamma}''$, or vice versa. In proposition 1, we consider both cases. In section 4.3.4, we analyse the relationship between these critical values in-depth.

Furthermore, it is ambiguous whether $\hat{\gamma}'$ and $\hat{\gamma}''$ are in the meaningful range of perceived abilities $\hat{\gamma}_1 \in [\gamma, \hat{\gamma}_{MAX}]$ (such that the perceived probability cannot exceed unity; see assumption A:1). In proposition 1, we consider “unrestricted” cases for $\hat{\gamma}'$ and $\hat{\gamma}''$. In section 4.3.4, we consider the effect of the restriction.

We pull lemmas 1 and 2 together to state the main result:

Proposition 1: *When the manager is overconfident about his current ability, and the future new project has a positive NPV, the effect of overconfidence on dividend choice and firm value is as follows:*

i) *If $\hat{\gamma}' < \hat{\gamma}''$, then:*

If $\hat{\gamma}_1 < \hat{\gamma}'$, the manager chooses the low dividend, and firm value is higher under this announcement than it would have been under the medium dividend:

$$V(D_L) > V(D_M) \forall \hat{\gamma}_1 < \hat{\gamma}'.$$

If $\hat{\gamma}_1 \in [\hat{\gamma}', \hat{\gamma}'']$, the manager switches to the medium dividend, and firm value falls: it is then lower under this announcement than it would have been under the low dividend:

$$V(D_L) > V(D_M) \forall \hat{\gamma}_1 \in [\hat{\gamma}', \hat{\gamma}''].$$

If $\hat{\gamma}_1 > \hat{\gamma}''$, the manager chooses the medium dividend, and firm value rises above the value under the low dividend: $V(D_M) > V(D_L) \forall \hat{\gamma}_1 > \hat{\gamma}''$.

ii) *If $\hat{\gamma}'' < \hat{\gamma}'$, then:*

If $\hat{\gamma}_1 < \hat{\gamma}''$, the manager chooses the low dividend, and firm value is higher under this announcement than it would have been under the medium dividend:

$$V(D_L) > V(D_M) \forall \hat{\gamma}_1 < \hat{\gamma}''.$$

If $\hat{\gamma}_1 \in [\hat{\gamma}'', \hat{\gamma}']$, the manager continues to choose the low dividend. Firm value is lower under this announcement than it would have been under the medium dividend:

$$V(D_L) < V(D_M) \forall \hat{\gamma}_1 \in [\hat{\gamma}'', \hat{\gamma}'].$$

If $\hat{\gamma}_1 > \hat{\gamma}'$, the manager switches to the medium dividend, and firm value immediately rises above the value under the low dividend: $V(D_M) > V(D_L) \forall \hat{\gamma}_1 > \hat{\gamma}'$.

Figures 4.1 and 4.2 clarifies proposition 1.

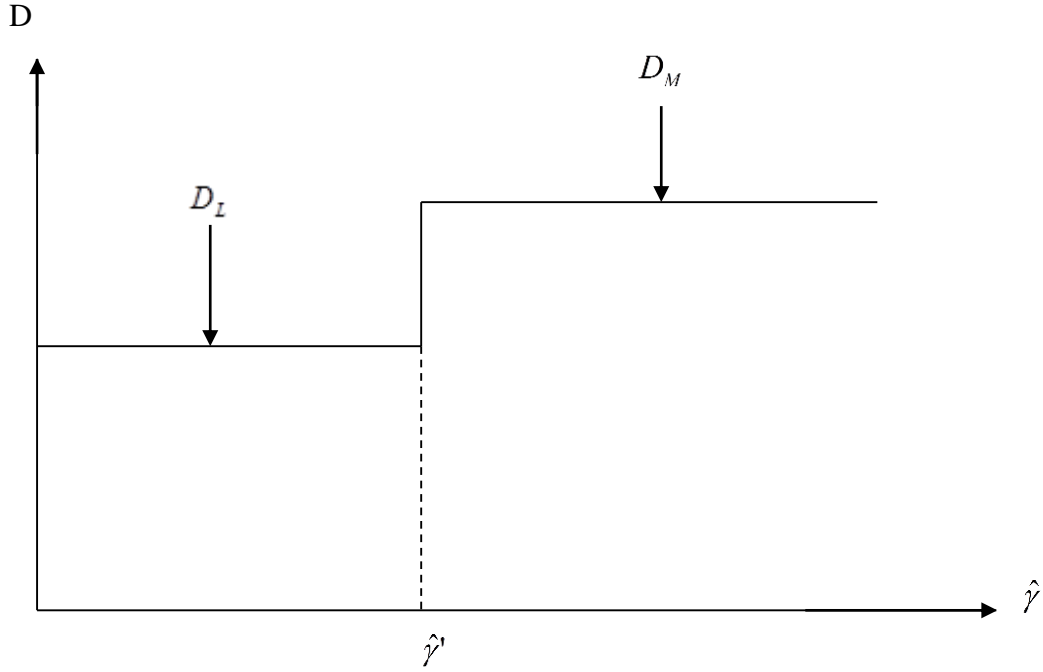


Figure 4.1: Effect of Managerial Overconfidence on Dividends.

Note that at critical level of $\hat{\gamma}'$, the manager *increases* dividend from low to medium level. The manager uses the medium dividend as a commitment to higher current effort (in order to increase the probability of having sufficient cash flow to be able to invest in the new project). He only does so if he is sufficiently overconfident in his ability.

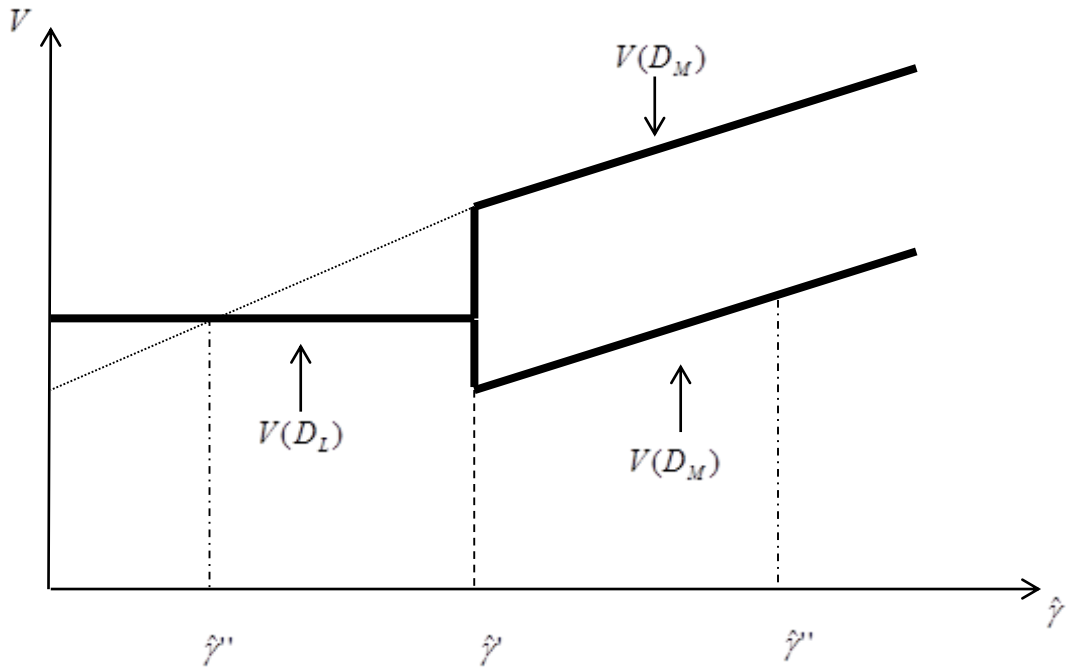


Figure 4.2: Effect of Managerial Overconfidence on Firm Value.

Note that at critical level of $\hat{\gamma}'$, the manager switches from low to medium dividend announcement. The effect of this announcement on firm value depends on relationship between $\hat{\gamma}'$, $\hat{\gamma}''$ and $\hat{\gamma}$ as stated in proposition 1 (i) and (ii).

4.4.4 The effect of private benefits

As noted, the relationship between the critical overconfidence parameters $\hat{\gamma}'$ and $\hat{\gamma}''$ is ambiguous. $\hat{\gamma}'$ may exceed, or be less than, $\hat{\gamma}''$ (see proposition 1 i and ii for the effect $\hat{\gamma}' > \hat{\gamma}''$ or $\hat{\gamma}' < \hat{\gamma}''$ on the overconfident manager's dividend decision, and firm value). Furthermore, it is not clear whether $\hat{\gamma}'$ and $\hat{\gamma}''$ lie in the critical range $\hat{\gamma}_1 \in [\gamma, \hat{\gamma}_{MAX}]$ to ensure the perceived probability cannot exceed unity. In this section, I analyse these relationships in more detail. Particularly, I analyse the effect of managerial private benefits B on these relationships.

We define a critical level of private benefits B' at which $\hat{\gamma}' = \hat{\gamma}''$. Therefore, I derive the following result:

Lemma 4: $\hat{\gamma}' < \hat{\gamma}''$ iff $B < B' = \frac{2\alpha(X-I)(R_H - R_L + X - I)(1-\gamma_1)}{[\gamma_1(R_H - R_L + X - I) - (X - I)]}$ (4.14)

How does managerial equity ownership affect this? When $\alpha = 0$, then $B' = 0$. Since $B > 0$, then $B > B'$. Therefore, from Lemma 4, $\hat{\gamma}' > \hat{\gamma}''$ for sure.

When $\alpha = 1$, it is ambiguous whether $B > B'$ or vice versa. We state the following:

Proposition 2

if $B > B'(\alpha = 1)$, then $\hat{\gamma}' > \hat{\gamma}'' \forall \alpha \in [0, 1]$. Therefore proposition 1 (ii) applies $\forall \alpha \in [0, 1]$

if $B < B'(\alpha = 1)$, then there exists a critical $\alpha^C \in (0, 1)$ for which;

when $\alpha \in [0, \alpha^C]$, $\hat{\gamma}' > \hat{\gamma}''$. Proposition 1 (ii) applies.

when $\alpha \in [\alpha^C, 1]$, $\hat{\gamma}' < \hat{\gamma}''$. Proposition 1 (i) applies.

Intuitively, if the manager has high private benefits he is more interested in these benefits than his current equity value. Therefore, he is more likely to choose low dividend. If he has low private benefits, his current equity level is crucial. For low equity level, he is more likely to choose low dividend whilst for high equity level he will switch to medium dividend for high perceived ability.

Next, we consider the conditions for $\hat{\gamma}'$ and $\hat{\gamma}''$ to lie in the meaningful interval $[\gamma, \hat{\gamma}_{MAX}]$ to ensure the perceived probability cannot exceed unity. Assumption (A:1), demonstrated that

$$\hat{\gamma}_{max} = \sqrt{\frac{2c}{B}}. \text{ Therefore,}$$

$$\begin{aligned} \hat{\gamma}' \leq \hat{\gamma}_{MAX} \text{ iff } 2B^2 + [2\alpha(X-I) - 1]B - 2(R_H - R_L + X - I) &\leq 0 \\ \Rightarrow B \leq 1 - 2\alpha(X-I) + Z \end{aligned} \quad (4.15)$$

where, $Z = \sqrt{\frac{(2\alpha X - 2\alpha I - 1)^2 + 8(R_H - R_L + X - I)}{4}}$

$$\hat{\gamma}'' \leq \hat{\gamma}_{MAX} \text{ iff } B \geq \frac{2c(X - I)^2}{\gamma_1^2 (R_H - R_L + X - I)^2} \quad (4.16)$$

Thus, we observe that the relationship between the critical values ($\hat{\gamma}'$ and $\hat{\gamma}''$) and gamma max ($\hat{\gamma}_{MAX}$) is complex. In the following tables, we consider the various combinations that can occur, and the effects on the results in proposition 2.

In the following tables, we draw these results together.

Table 4.2: The relationship between critical $\hat{\gamma}'$, $\hat{\gamma}''$ and $\hat{\gamma}_{MAX}$	
If $\hat{\gamma}' < \hat{\gamma}''$ then;	
If $\hat{\gamma}' < \hat{\gamma}'' < \hat{\gamma}_{MAX}$	Proposition 1 i), a)-c) applies.
If $\hat{\gamma}' < \hat{\gamma}_{MAX} < \hat{\gamma}''$	Proposition 1 i), a)-b) applies.
If $\hat{\gamma}_{MAX} < \hat{\gamma}' < \hat{\gamma}''$	Proposition 1 i), a) applies.
If $\hat{\gamma}'' < \hat{\gamma}'$ then;	
If $\hat{\gamma}'' < \hat{\gamma}' < \hat{\gamma}_{MAX}$	Proposition 1 ii), a)-c) applies.
If $\hat{\gamma}'' < \hat{\gamma}_{MAX} < \hat{\gamma}'$	Proposition 1 ii), a)-b) applies.
If $\hat{\gamma}_{MAX} < \hat{\gamma}'' < \hat{\gamma}'$	Proposition 1 ii), a) applies.

In the following section, we present a numerical example for Model 1 where the private benefits are such that $\hat{\gamma}' < \hat{\gamma}'' < \hat{\gamma}_{MAX}$.

4.4.5 Numerical example for Model 1

We illustrate *model 1* by way of a numerical example with the following parameter values: $\gamma_1 = 0.1$, $\hat{\gamma}_1 \in [0.1, 0.9]$, $\alpha = 0.1$, $R_H = 1000$, $R_L = 100$, $I = 50$, $X = 100$, $B = 40$ and $c = 20$.

Table 4.3. The effort and, the manager's true and perceived probability for given $\hat{\gamma}_1$, for the three levels of dividends.

$\hat{\gamma}_1$	Medium Dividend			Low Dividend			High Dividend		
	Effort	True Probability	Perceived Probability	Effort	True Probability	Perceived Probability	Effort	True Probability	Perceived Probability
0.1	0.1	0.01	0.01	0	0	0	0	0	0
0.2	0.2	0.02	0.04	0	0	0	0	0	0
0.3	0.3	0.03	0.09	0	0	0	0	0	0
0.4	0.4	0.04	0.16	0	0	0	0	0	0
0.5	0.5	0.05	0.25	0	0	0	0	0	0
0.6	0.6	0.06	0.36	0	0	0	0	0	0
0.7	0.7	0.07	0.49	0	0	0	0	0	0
0.8	0.8	0.08	0.64	0	0	0	0	0	0
0.9	0.9	0.09	0.81	0	0	0	0	0	0

Table 4.4 Manager perceived payoff and firm value for given $\hat{\gamma}_1$, for the three levels of dividends.

$\hat{\gamma}_1$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	11	110	15	150	10	100
0.2	13	119	15	150	10	100
0.3	15	129	15	150	10	100
0.4	17	138	15	150	10	100
0.5	20	148	15	150	10	100
0.6	23	157	15	150	10	100
0.7	26	167	15	150	10	100
0.8	30	176	15	150	10	100
0.9	35	186	15	150	10	100

As it can be seen from the Table 4.4, the manager will never choose high dividend. When the level of overconfidence $\hat{\gamma}_1 = 0.3$, the manager perceived payoff is exactly the same from choosing low and medium dividend ($\hat{\Pi}_M^L(D_L) = \hat{\Pi}_M^M(D_M) = 15$) representing the critical $\hat{\gamma}'$. In this case the firm value under low dividend is higher than under the medium dividend $V(D_L) > V(D_M)$. Note that, when $\hat{\gamma}_1 = 0.4$ the manager perceived payoff is higher under the medium dividend than the low dividend, but the firm value is lower under the medium dividend. This presents a case where manager might switch from low to medium dividend in order to maximise his payoff, while reducing the firm value (see proposition 1-(i)-(b)). As $\hat{\gamma}_1 > 0.3$ the manager's perceived payoff increases under the medium dividend compared with the low dividend, and the firm value only rises under the medium dividend when $\hat{\gamma}_1 > 0.5$ (see

proposition 1-(i)-(c)). For clarity, we have inserted these numerical values into Figures 4.3 to 4.6.

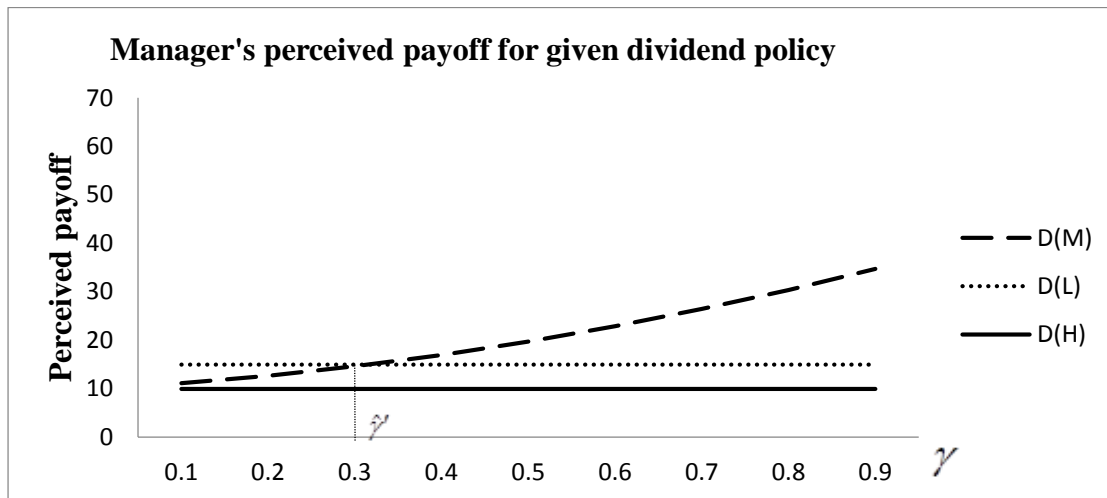


Figure 4.3 Manager's perceived payoff for given dividend policy.

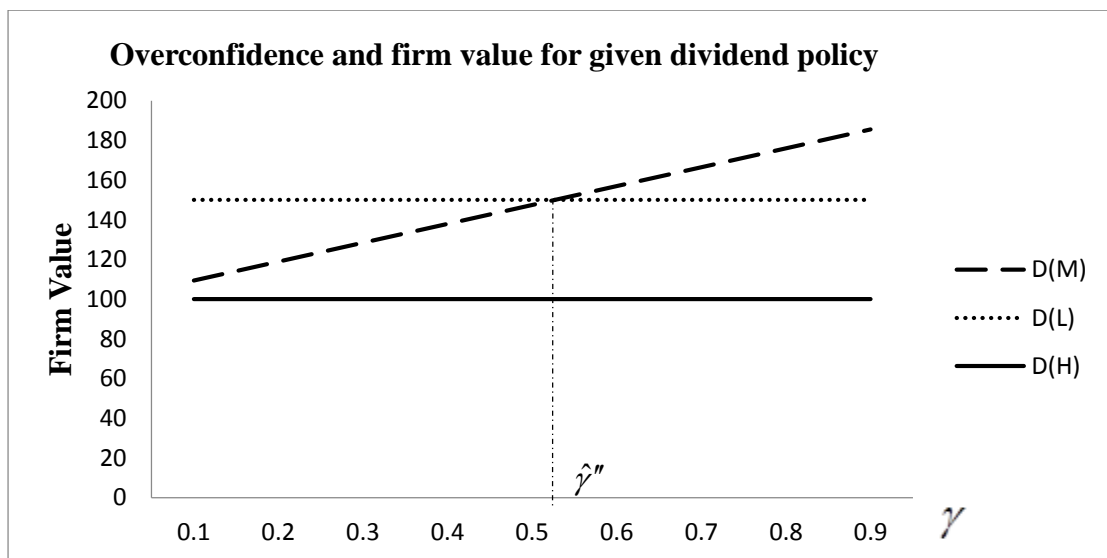


Figure 4.4 The relationship between overconfidence and firm value for given levels of dividend.

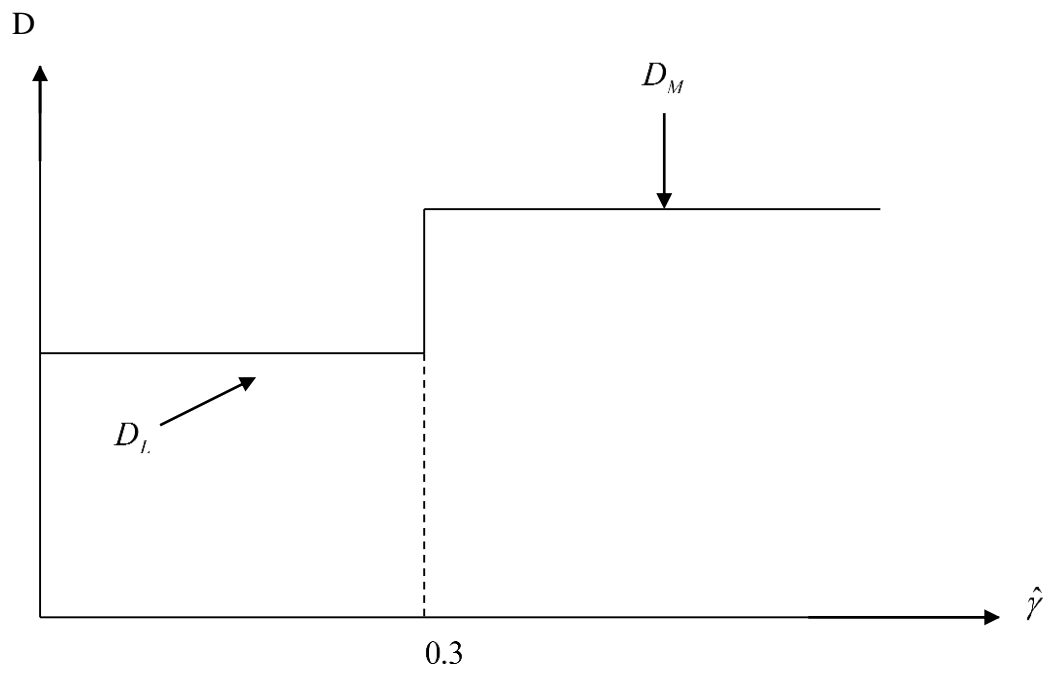


Figure 4.5: Effect of Managerial Overconfidence on Dividends.

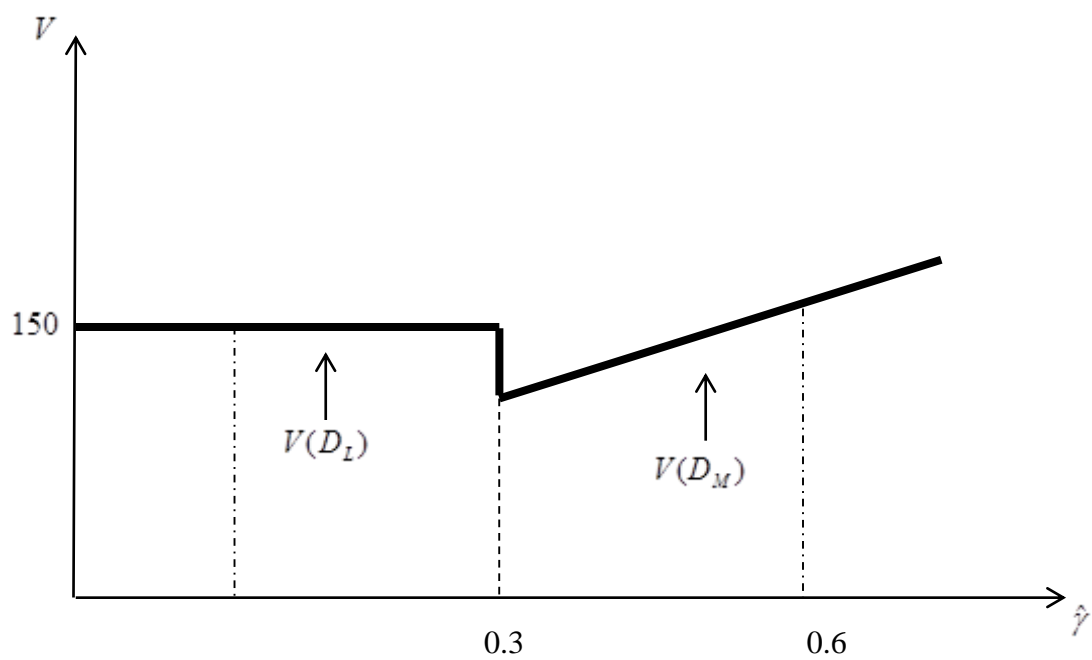


Figure 4.6: Effect of Managerial Overconfidence on Firm value.

4.5 Model 2: The manager is overconfident about his ability on the future project, and the project may have positive or negative NPV

In the model 1, we considered a case where managerial overconfidence led to higher dividends, and the manager used dividends to commit to higher effort on current project. Recalling the existing research is ambiguous about whether overconfidence leads to higher or low dividends. We now wish to consider how overconfidence leads to lower dividends.

In this case, the timeline is as follows:

Date 0: The firm has a current risky project. It may succeed in (with probability p_1), in which case it provides income $R_H > I$, where I is the amount needed for investing in new project 2. Alternatively, it may fail (with probability $p_1 \in [0,1]$), in which case, it provides income R_L , where $R_H > R_L > 0$.

At this stage, the manager makes a dividend announcement: either $D_L \leq R_L - I$ (low dividend), $D_M \in (R_L - I, R_H - I]$ (medium dividend) or $D_H > R_H - I$ (high dividend). Note that, in the case of the low (high) dividend, the manager is able (unable) to invest in the new project. Further, in the case of medium dividend, the manager is able to invest in new project in the case of success in current project (project 1).

Date 1: If the manager is able to (that is, in the case of the low dividend and in the case of medium dividend following the success of current project), he chooses whether to invest in the new project.

Date 2: if the new project has been taken, the manager exerts effort in the project. It succeeds at date 3 with probability $p_2 = \gamma_2 e_2$, where $p_2 \in [0,1]$. The overconfident manager believes that it succeeds with probability $\hat{p}_2 = \hat{\gamma}_2 e_2$, where $\hat{p}_2 \in [0,1]$, with $\hat{\gamma}_2 > \gamma_2$. If it succeeds, it provides income $X > 0$. if it fails, it provides zero income. Also if project 2 is successful, it provides private benefits of $B > 0$. There are no private benefits in the case of failure.

Date 3: the game ends.

Note that, since the manager receives his monetary reward at date 0, he will take the new project at date 1 if he can (that is, under the low dividend, or medium dividend following the success of current project), due to expected private benefits. Thus, he acts to maximise his date 0 expected payoff:

$$\hat{\Pi}_m = \alpha \bar{V}_0 + E(B) - C \quad (4.17)$$

where C is his expected effort costs in the second project as viewed from date 0. If the manager takes the second project, $C = ce_2^2$ and $C = 0$ in the case he does not take the second project.

Furthermore, in Eq. (4.13), \bar{V}_0 is the market value of the firm given the announcement of dividends.

The market values the firm at date 0 as follows:

$$\bar{V}_0 = p_1 R_H + (1 - p_1) R_L + E(N) \quad (4.18)$$

where, $E(N)$ is the expected net present value of the new project given manager date 0 dividend announcement. Hence, the manager choice of dividends will affect the value of the firm \bar{V}_0 at date 0, since the manager's dividend announcement will affect his ability to take the new project which affects the date 0, $E(N)$. For example, the manager may announce high dividend to commit to the market not to take the new project (due to the negative NPV), which will then result in the market providing a higher date 0 valuation \bar{V}_0 .

Solving backwards, we first consider the manager's choice of effort in date 2, given the manager's decision whether to invest in new project in date 1. Then we move back to date 0 to solve for the manager's optimal date 0 dividend announcement.

4.5.1 Manager's date 2 effort choice

At this stage we take as given that the manager is able to take the second project which in the case of low dividend with either realisation of project 1, or medium dividend with good realisation of project 1. He then exerts effort to maximise

$$\hat{\Pi}_M = \alpha \bar{V}_0 + \hat{\gamma}_2 e_2 B - c e_2^2 \quad (4.19)$$

The manager's optimal effort is therefore:

$$e_2^* = \frac{\hat{\gamma}_2 B}{2c} \quad (4.20)$$

The date 0 market value of the firm is $\bar{V}_0 = p_1 R_H + (1 - p_1) R_L + \gamma_2 \bar{e}_2 X - I$, where \bar{e}_2 is the market anticipation of the manager's effort given dividend announcement.

Therefore, the manager's expected payoff from taking project 2 is:

$$\Pi_M^* = \alpha \bar{V}_0 + \frac{\hat{\gamma}_2^2 B^2}{4c} \quad (4.21)$$

Since $(\frac{\hat{\gamma}_2^2 B^2}{4c})$ is positive, this confirms that the manager will take the new project at date 2 if he can (in the case of low dividend with either realisation of project 1, or medium dividend with good realisation).

The true expected NPV of the new project is

$$E(N) = \gamma_2 \bar{e}_2 X - I = \frac{\gamma_2 \hat{\gamma}_2 BX}{2c} - I \quad (4.22)$$

The overconfident manager's perception of the expected NPV of the new project is

$$E(\hat{N}) = \hat{\gamma}_2 \bar{e}_2 X - I = \frac{\hat{\gamma}_2^2 BX}{2c} - I \quad (4.23)$$

4.5.2 The manager's date 0 dividend choice.

We now move back to date 0 to solve for the manager's optimal dividend announcement. The manager compares his expected payoff in the case that he chooses the high, medium or low dividend as follows:

4.5.2.1 In the case of high dividend announcement

Here we consider the case where the manager chooses high dividend at date 0. In this case, he will be unable to invest in the new project (project 2), regardless of the realisation of the current project.

Hence, the market value of the firm becomes:

$$\bar{V}_0 = p_1 R_H + (1 - p_1) R_L \quad (4.24)$$

Therefore, his expected payoff at date 0 is:

$$\hat{\Pi}_M^H(D_H) = \alpha[p_1 R_H + (1 - p_1) R_L] \quad (4.25)$$

4.5.2.2 In the case of medium dividend announcement

In the case where manager announces medium dividend, he will be able (unable) to invest in the new project in the case of good (bad) realisation of the current project (project one).

Hence, the market value of the firm becomes:

$$\bar{V}_0 = p_1 (R_H + \gamma_2 \bar{e}_2 X - I) + (1 - p_1) R_L \quad (4.26)$$

Therefore, his expected payoff at date 0 is:

$$\hat{\Pi}_M^M(D_M) = \alpha[p_1 (R_H + \gamma_2 \bar{e}_2 X - I) + (1 - p_1) R_L] + p_1 (\hat{\gamma}_2 e_2 B - c e_2^2) \quad (4.27)$$

Substituting Eq. (4.17) into Eq. (4.24), we obtain the manager's perceived payoff at date 0, given the medium dividend, as follows:

$$\hat{\Pi}_M^M(D_M) = \alpha[p_1 R_H + (1 - p_1) R_L + p_1 \frac{\hat{\gamma}_2^2 BX}{2c} - p_1 I] + p_1 \frac{\hat{\gamma}_2^2 B^2}{4c} \quad (4.28)$$

4.5.2.3 In the case of low dividend announcement

Given that the manager chooses low dividend at date 0, he will be able to take the new project (project 2), regardless of the realisation of project's 1 income.

Hence, the market value of the firm becomes:

$$\bar{V}_0 = p_1 R_H + (1 - p_1) R_L + \gamma_2 \bar{e}_2 X - I \quad (4.29)$$

Therefore, his expected payoff at date 0 is:

$$\hat{\Pi}_M^L(D_L) = \alpha[p_1 R_H + (1 - p_1) R_L + \gamma_2 \bar{e}_2 X - I] + \hat{\gamma}_2 e_2 B - c e_2^2 \quad (4.30)$$

Substituting Eq. (4.17) into Eq. (4.27), we obtain the manager's perceived payoff at date 0, given the low dividend, as follows:

$$\hat{\Pi}_M^L(D_L) = \alpha[p_1 R_H + (1 - p_1) R_L + \frac{\hat{\gamma}_2^2 B X}{2c} - I] + \frac{\hat{\gamma}_2^2 B^2}{4c} \quad (4.31)$$

Examination of the manager's expected payoff $\hat{\Pi}_M^H, \hat{\Pi}_M^M$ and $\hat{\Pi}_M^L$ in Eq. (4.25), (4.28) and (4.31) respectively, given the dividend announcement, reveals the following result:

Lemma 5:

a) *The manager chooses the high dividend if*

$$\hat{\gamma}_2 < \hat{\gamma}^C = \sqrt{\frac{4\alpha c I}{2\alpha B X + B^2}}. \quad (4.32)$$

b) *If $\hat{\gamma}_2 > \hat{\gamma}^C$, the manager chooses the low dividend.*

and the manager never chooses the medium dividend.

Lemma 5 Proof:

Comparison of $\hat{\Pi}_M^H, \hat{\Pi}_M^M$ and $\hat{\Pi}_M^L$ reveals that

If $\hat{\gamma}_2 > \hat{\gamma}^C$, then $\hat{\Pi}_M^L(D_L) \geq \hat{\Pi}_M^M(D_M)$ and $\hat{\Pi}_M^L(D_L) \geq \hat{\Pi}_M^H(D_H)$. Thus the manager maximising his payoff by choosing low dividend.

If $\hat{\gamma}_2 < \hat{\gamma}^C$, then $\hat{\Pi}_M^M(D_M) > \hat{\Pi}_M^L(D_L)$, $\hat{\Pi}_M^H(D_H) > \hat{\Pi}_M^L(D_L)$ and $\hat{\Pi}_M^H(D_H) > \hat{\Pi}_M^M(D_M)$.

Therefore, it is optimal for manager to choose high dividend. The manager never chooses medium dividend.

Note that low and high dividend dominate medium dividend. For example, if the manager wants to use dividend to commit not to take the new project (due to negative NPV), then high dividend is definitely better than medium dividend (as that gives manager a chance of taking the new project). Also, if the manager wants to take the new project (due to private benefits),

he definitely chooses low dividend (as medium dividend means that there is a chance of not being able to take the new project).

Finally, we consider the effect of overconfidence on firm value. I note that $V(D_L) > V(D_H)$ iff

$$p_1 R_H + (1 - p_1) R_L + \frac{\hat{\gamma}_2 \gamma_2 B X}{2c} - I > p_1 R_H + (1 - p_1) R_L$$

$$\Rightarrow \frac{\hat{\gamma}_2 \gamma_2 B X}{2c} - I > 0$$

Defining the critical level of overconfidence $\hat{\gamma}_c$ at which $V(D_L) = V(D_H)$, we are able to state the next result.

Lemma 6: *Firm value is higher under the low dividend announcement (compared to the high dividend) if*

$$\hat{\gamma}_2 > \hat{\gamma}_c = \frac{2cI}{\gamma_2 B X} \quad (4.33)$$

If $\hat{\gamma}_2 < \hat{\gamma}_c$, firm value is higher under the high dividend announcement (compared to the low dividend)

Drawing lemmas 3 and 4 together, we obtain our second major result:

Proposition 3: *When the manager is overconfident about his future ability (and the future new project may have a positive or negative NPV, depending on the manager's effort and ability), the effect of overconfidence on dividend choice and firm value is as follows:*

i) *If $\hat{\gamma}^c < \hat{\gamma}_c$, then:*

If $\hat{\gamma}_2 < \hat{\gamma}^c$, the manager chooses the high dividend, and firm value is higher under this announcement than it would have been under the low dividend: $V(D_H) > V(D_L) \forall \hat{\gamma}_2 < \hat{\gamma}^c$.

If $\hat{\gamma}_2 \in [\hat{\gamma}^c, \hat{\gamma}_c]$, the manager switches to the low dividend, and firm value falls: it is then lower under this announcement than it would have been under the high dividend: $V(D_L) > V(D_H) \forall \hat{\gamma}_2 \in [\hat{\gamma}^c, \hat{\gamma}_c]$.

If $\hat{\gamma}_2 > \hat{\gamma}_c$, the manager continues to choose the low dividend, and firm value rises above the value under the high dividend: $V(D_H) > V(D_L) \forall \hat{\gamma}_2 > \hat{\gamma}_c$.

ii) *If $\hat{\gamma}_c < \hat{\gamma}^c$, then:*

If $\hat{\gamma}_2 < \hat{\gamma}_c$, the manager chooses the high dividend, and firm value is higher under this announcement than it would have been under the low dividend: $V(D_H) > V(D_L) \forall \hat{\gamma}_2 < \hat{\gamma}_c$.

If $\hat{\gamma}_2 \in [\hat{\gamma}_C, \hat{\gamma}^C]$, the manager continues to choose the high dividend. Firm value is lower under this announcement than it would have been under the low dividend: $V(D_H) < V(D_L) \forall \hat{\gamma}_2 \in [\hat{\gamma}_C, \hat{\gamma}^C]$.

If $\hat{\gamma}_2 > \hat{\gamma}^C$, the manager switches to the low dividend, and firm value immediately rises above the value under the high dividend: $V(D_L) > V(D_H) \forall \hat{\gamma}_2 > \hat{\gamma}^C$.

Figures 4.7 and 4.8 clarifies proposition 2.

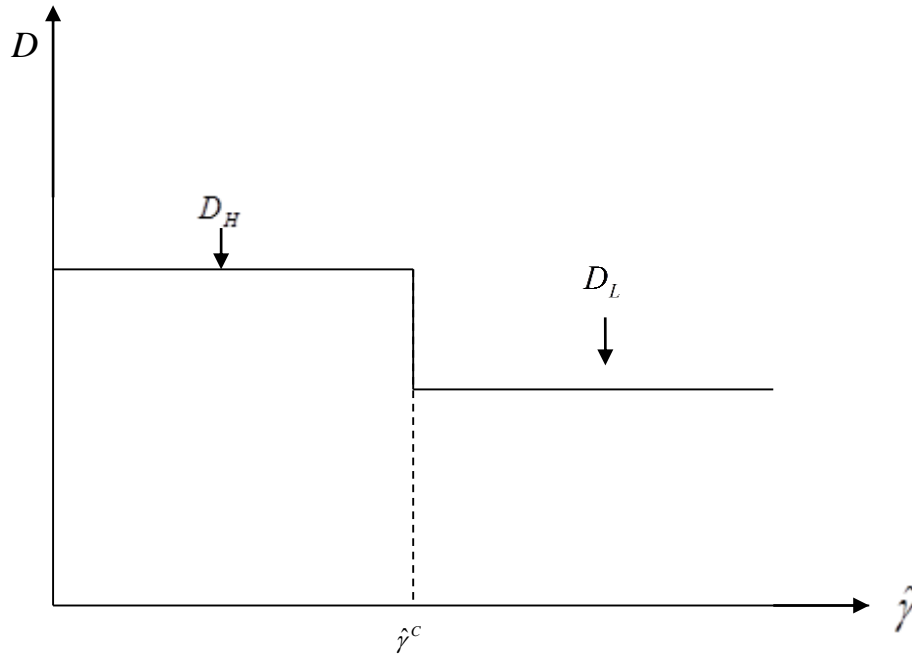


Figure 4.7: Effect of Managerial Overconfidence on Dividends.

Note that this diagram represents a Potential free cash flow problem: future project may have a negative or positive NPV, depending on managerial ability and effort. If the manager expects the future project to have negative NPV (and his private benefit from the new project is low), he announces high dividend as a commitment not to take new project. At critical level $\hat{\gamma}^C$, the manager *decreases* dividend from high to low level in order to be able to take the new project.

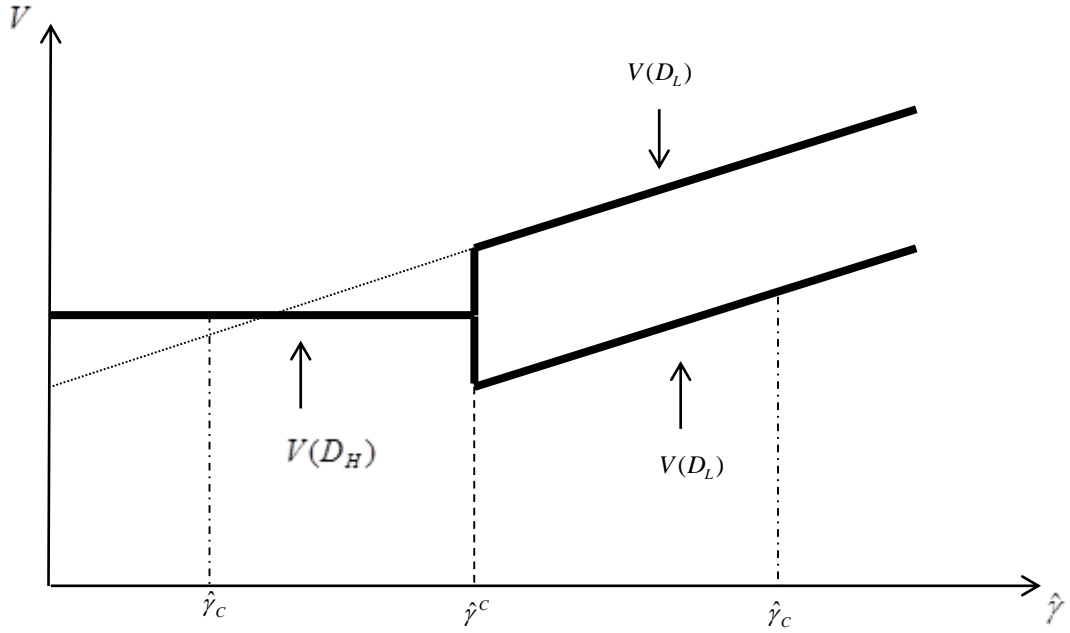


Figure 4.8: Effect of Managerial Overconfidence on Firm value.

4.5.3 The effect of private benefits

In this section we examine the effect of private benefits on the relationship between $\hat{\gamma}^c$, $\hat{\gamma}_c$ and $\hat{\gamma}_{MAX}$.

Lemma 7: $\hat{\gamma}^c > \hat{\gamma}_c$ when $B > B'' = \frac{2\alpha cXI}{\alpha\gamma_2^2 X^2 - cI}$ (4.34)

What is the effect of managerial equity ownership α on the critical private benefits B'' ?

In the following diagram we consider B'' as a function of α .

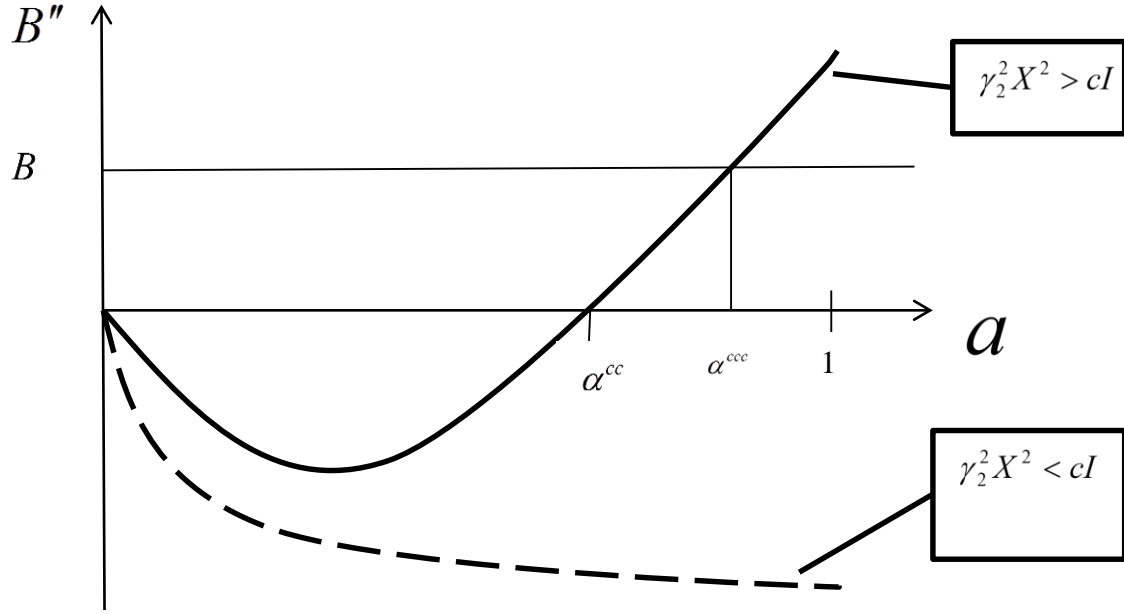


Figure 4.9: B'' as a function of α

We note that $B'' = 0$ when $\alpha = 0$. Furthermore, we note that the shape of the function depends crucially on the relationship between $\gamma_2^2 X^2$ and cI . Particularly, when $\gamma_2^2 X^2 < cI$, the function is downward sloping for all α . Therefore, when $\gamma_2^2 X^2 < cI$, B'' is negative for all α .

When $\gamma_2^2 X^2 > cI$, the function is downward sloping for low levels of α , but there is a point at which it turns to slope upwards. Therefore, there *may* be equity level α^{cc} at which the function turns positive (as in the diagram). If $B > B'' = \frac{2cXI}{\gamma_2^2 X^2 - cI}$, then it is unambiguous that

$B > B'' \forall \alpha \in [0,1]$. If $B < B'' = \frac{2cXI}{\gamma_2^2 X^2 - cI}$, there will be a critical equity level $\alpha^{ccc} \in (\alpha^{cc}, 1)$, at

which $B = B''$.

Therefore, we can state the following:

Proposition 4:

When $\gamma_2^2 X^2 < cI$, then $\hat{\gamma}^C > \hat{\gamma}_C \quad \forall \alpha \in [0,1]$

when $\gamma_2^2 X^2 > cI$, if $\alpha^{ccc} > 1$, then $\hat{\gamma}^C > \hat{\gamma}_C \quad \forall \alpha \in [0,1]$

when $\gamma_2^2 X^2 > cI$, if $\alpha^{ccc} \in (\alpha^{cc}, 1)$ then

If $\alpha \in [0, \alpha^{ccc}]$ then $\hat{\gamma}^C > \hat{\gamma}_C$.

If $\alpha \in [\alpha^{ccc}, 1]$ then $\hat{\gamma}^C < \hat{\gamma}_C$.

Next, we need to consider the conditions for the critical values to lie in the meaningful range $[\gamma, \hat{\gamma}_{MAX}]$.

We note that $\hat{\gamma}^C < \hat{\gamma}_{MAX}$ when $B > 2\alpha(I - X)$

We note that $\hat{\gamma}_C < \hat{\gamma}_{MAX}$ when $B > \frac{2cI^2}{\gamma_2^2 X^2}$

Thus, we observe that the relationship between the critical values ($\hat{\gamma}^C$ and $\hat{\gamma}_C$) and gamma max ($\hat{\gamma}_{MAX}$) is complex. In the following tables, we consider the various combinations that can occur, and the effects on the results in proposition 3. In the following tables, we draw these results together.

Table 4.5: The relationship between critical $\hat{\gamma}^C$, $\hat{\gamma}_C$ and $\hat{\gamma}_{MAX}$	
If $\hat{\gamma}^C < \hat{\gamma}_C$ then;	
If $\hat{\gamma}^C < \hat{\gamma}_C < \hat{\gamma}_{MAX}$	Proposition 3 i), a)-c) applies.
If $\hat{\gamma}^C < \hat{\gamma}_{MAX} < \hat{\gamma}_C$	Proposition 3 i), a)-b) applies.
If $\hat{\gamma}_{MAX} < \hat{\gamma}^C < \hat{\gamma}_C$	Proposition 3 i), a) applies.
If $\hat{\gamma}_C < \hat{\gamma}^C$ then;	
If $\hat{\gamma}_C < \hat{\gamma}^C < \hat{\gamma}_{MAX}$	Proposition 3 ii), a)-c) applies.
If $\hat{\gamma}_C < \hat{\gamma}_{MAX} < \hat{\gamma}^C$	Proposition 3 ii), a)-b) applies.
If $\hat{\gamma}_{MAX} < \hat{\gamma}_C < \hat{\gamma}^C$	Proposition 3 ii), a) applies.

In the appendix (A2), we present a numerical example for model 2 where the private benefits are such that $\hat{\gamma}^C < \hat{\gamma}_C < \hat{\gamma}_{MAX}$.

Note that one potential problem in our models is that if the constraints of private benefits B from both models are imposed, a common solution to both models may not exist. However, the next numerical example shows that for the chosen value parameters, a viable solution exists.

4.5.4 Numerical example for Model 2

We illustrate *model 2* by way of a numerical example with the following parameter values: $p_1 = 0.5$, $\gamma_2 = 0.1$, $\hat{\gamma}_2 \in [0.1, 0.9]$, $\alpha = 0.1$, $R_H = 1000$, $R_L = 100$, $I = 50$, $X = 100$, $B = 40$ and $c = 20$.

Table 4.6. The effort and, the manager's true and perceived probability for given $\hat{\gamma}_2$, for the three levels of dividends

$\hat{\gamma}_2$	Medium Dividend			Low Dividend			High Dividend		
	Effort	True Probability	Perceived Probability	Effort	True Probability	Perceived Probability	Effort	True Probability	Perceived Probability
0.1	0.1	0.01	0.01	0.1	0.01	0.01	0	0	0
0.2	0.2	0.02	0.04	0.2	0.02	0.04	0	0	0
0.3	0.3	0.03	0.09	0.3	0.03	0.09	0	0	0
0.4	0.4	0.04	0.16	0.4	0.04	0.16	0	0	0
0.5	0.5	0.05	0.25	0.5	0.05	0.25	0	0	0
0.6	0.6	0.06	0.36	0.6	0.06	0.36	0	0	0
0.7	0.7	0.07	0.49	0.7	0.07	0.49	0	0	0
0.8	0.8	0.08	0.64	0.8	0.08	0.64	0	0	0
0.9	0.9	0.09	0.81	0.9	0.09	0.81	0	0	0

Table 4.7. Manager perceived payoff and firm value for given $\hat{\gamma}_2$, for the three levels of dividends.

$\hat{\gamma}_2$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	53	529	51	508	55	550
0.2	54	533	52	516	55	550
0.3	55	537	54	524	55	550
0.4	56	541	56.4	532	55	550
0.5	57	545	59	540	55	550
0.6	59	549	62	548	55	550
0.7	60	553	65	556	55	550
0.8	62	557	69	564	55	550
0.9	64	561	73	572	55	550

This numerical example in table 6 shows that manager will never choose medium dividend. For a level of overconfidence $\hat{\gamma}_2 \in [0.1, 0.3]$ manager chooses high dividend as it yields more expected payoff than under low dividend. Also, at this range the firm value is higher under the announcement of high dividend than it is under the low dividend announcement $V(D_H) > V(D_L)$ which is in line with our proposition 2 (i ,a) and (ii, b). However, when $\hat{\gamma}_2 \geq 0.4$ manager switches from high to low dividend due to the expected payoff (which is higher in the case of low dividend that it would be in the high dividend) and firm value is lower

under this announcement than it would have been under the low dividend $V(D_H) < V(D_L)$, again consistent with our proposition 2 (i ,b). The figures 3 and 4 clarify this example.

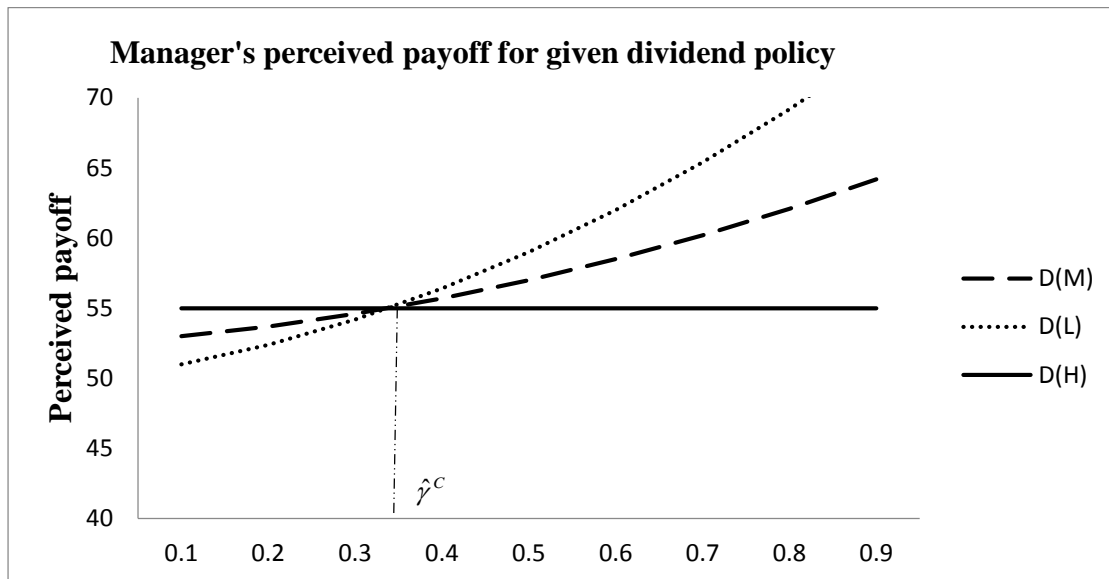


Figure 4.10 shows manager's perceived payoff for given dividend policy.

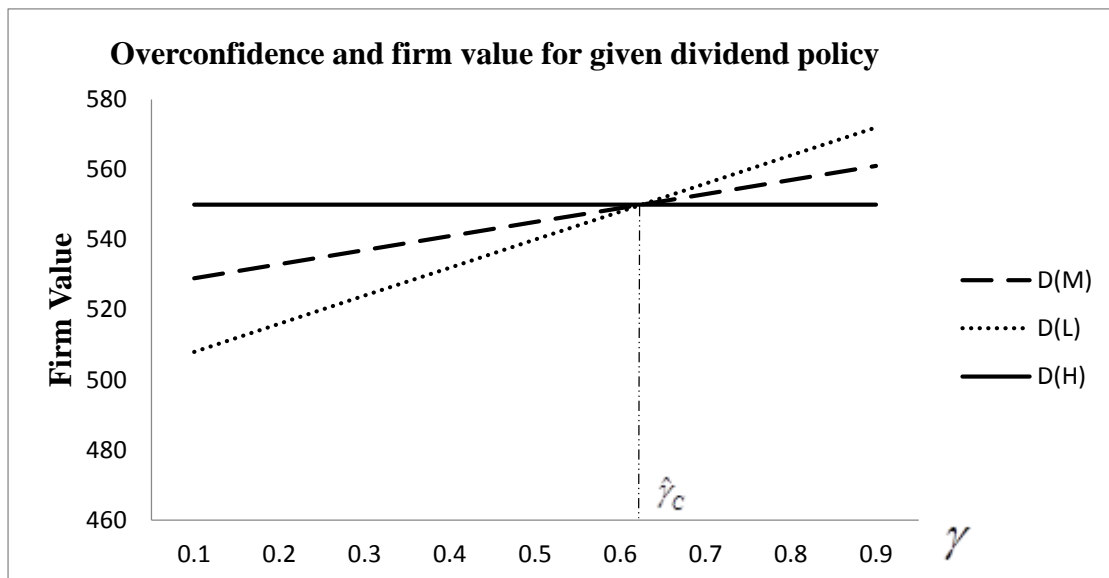


Figure 4.11 presents the relationship between overconfidence and firm value for given levels of dividend.

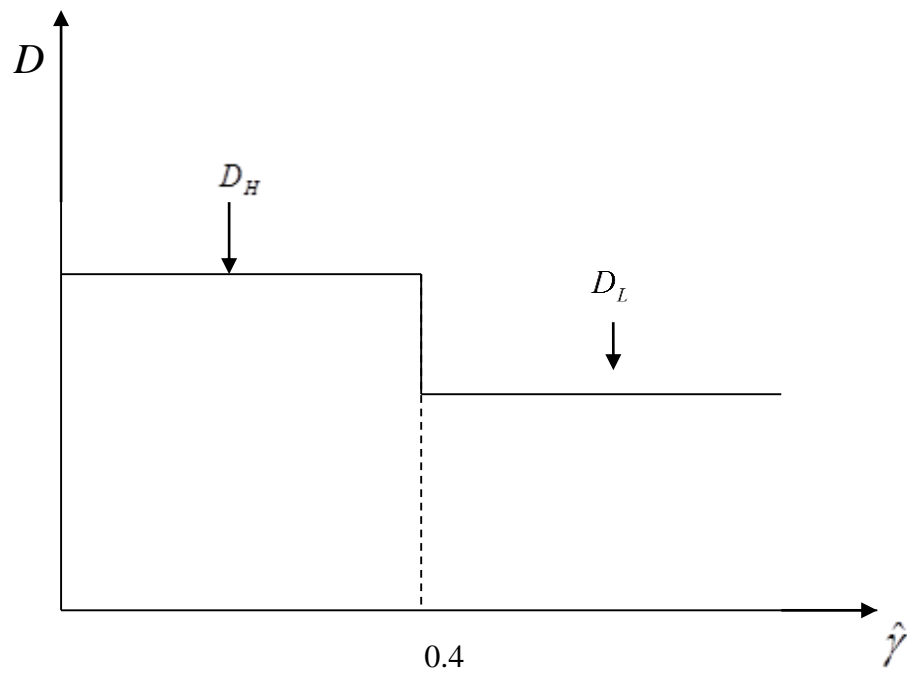


Figure 4.12: Effect of Managerial Overconfidence on Dividends.

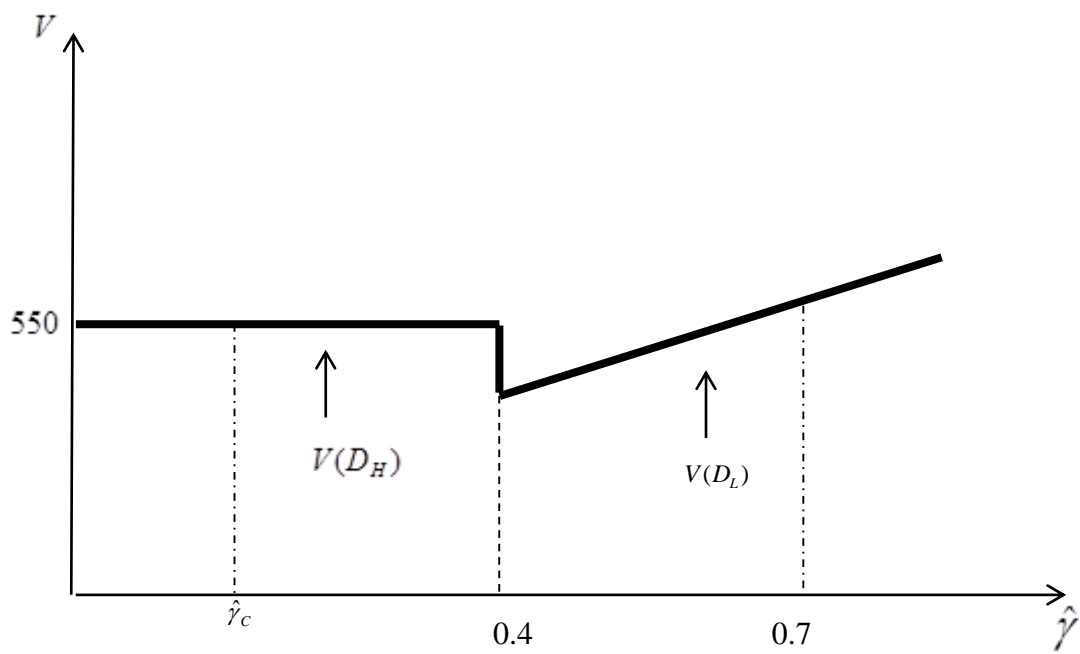


Figure 4.13: Effect of Managerial Overconfidence on Firm value.

4.6 Overconfidence, bounded rationality, and dividend policy

Previous sections analyse the impact of a managerial cognitive bias, overconfidence, on dividend policy, without considering managerial bounded rationality. In other words, those models assume that there is no limit on manager's ability to realise the way that the dividend announcement is used for: either to commit to higher effort on current project which leads overconfident manager to announce sufficiently high dividends as in Model 1; or to pay low dividends to enable manager to take the future project as in Model 2.

Simon (1978) introduces the concept of bounded rationality into the economic literature. Guesnerie and Oddou (1988) consider the limited ability of managers to process information when modelling the conflict between factors that lead to an increased return to size. Thus, the purpose of this section is to study the effect of overconfident manager on dividend policy when he has bounded capacity to understand under which regime he is. In other words he believes that his payoff of a given dividend announcement moves between the two states. Hence, the transition probability between the two states, as well as his overconfidence could have an impact on corporate dividend policy.

Barberis *et al.* (1998) theoretically demonstrate the important of considering investors' bounded rationality to explain overreaction and underreaction of stock prices. Specifically, they assume that investors fail to understand that earnings of assets follow a random walk. Rather investors believe earnings are mean-reverting or follow a trend (i.e., earnings increase after an increase). Similarly, our model how a manager fails to judge the use of dividend announcement. Similar to Barberis *et al.* (1998) model we assume that manager forms his expectation by given probability to each state.

Recall from the previous two models that the manager's expected payoff drives the level of dividend announcement. Firm value is also affected by the choice of dividend level. Managerial bounded rationality also is more likely to have an impact on manager expected payoff. The bounded rationality exists in the form that the manager does not have enough information to decide how the dividend announcement is to be used. The limited information that manager has lead him to calculate his expected payoff based on the outcome of the two states. Given that manager does not fully understand under which models he is, managers assign probability of $q \in [0,1]$ and $(1-q)$ of being in Models 1 and 2, respectively.

Therefore, manager expected payoff is the weighted average of the managerial payoff in the two models:

$$E(\hat{\Pi}^M) = q\hat{\Pi}_{M1}^M(D_{i=L,M,H}) + (1-q)\hat{\Pi}_{M2}^M(D_{i=L,M,H}) \quad (4.35)$$

and firm expected value is the weighted average of firm's value for given choice of dividends announcement:

$$E(V_0) = qV_{0,M1}(D_{i=L,M,H}) + (1-q)V_{0,M2}(D_{i=L,M,H}) \quad (4.36)$$

where q is the probability that manager believes he is in Model 1; $\hat{\Pi}_{M1}^M$ and $\hat{\Pi}_{M2}^M$ are manager perceived payoff from Models 1 and 2, respectively for given dividend announcement; $(D_{i=L,M,H})$ is the announcement of dividend levels either low, medium or high; and $V_{0,M1}$ and $V_{0,M2}$ are firm expected value in Models 1 and 2, respectively.

Note that managerial bounded rationality affects his expected payoffs. For example, when manager believes that $q = 0$, thus represents a case where the manager fully believes that his expected payoff generated from regime 2: Model 2. His expected payoff and firm expected value will be as Model 2. However, when the manager assigns probability for Models 1 and 2 ($1 > q > 0$), his expected payoff and firm expected value are the weighted average of the expected managerial payoff and expected firm value from the two models. Therefore, the manager bounded rationality affects his expected payoff and firm expected value as follows:

- **In the case of low dividends:**

Under the announcement of low dividend, the manager's perceived payoff is the weighted average of his expected payoff from Models 1 and 2 from announcing low dividends. Hence, the manager's expected payoff is

$$E(\hat{\Pi}^M(D_L)) = q\hat{\Pi}_{M1}^M(D_L) + (1-q)\hat{\Pi}_{M2}^M(D_L) \quad (4.37)$$

Firm value becomes

$$E(V_0(D_L)) = qV_{0,M1}(D_L) + (1-q)V_{0,M2}(D_L) \quad (4.38)$$

where $\hat{\Pi}_{M1}^M(D_L)$ and $\hat{\Pi}_{M2}^M(D_L)$ are the manager's expected payoff from announcing low dividends in Model 1 and 2, respectively. $V_{0,M1}(D_L)$ and $V_{0,M2}(D_L)$ are firm expected value for Models 1 and 2, respectively.

- **In the case of medium dividends:**

Given that manager announces of medium dividends, his perceived payoff is

$$E(\hat{\Pi}^M(D_M)) = q\hat{\Pi}_{M1}^M(D_M) + (1-q)\hat{\Pi}_{M2}^M(D_M) \quad (4.39)$$

Firm expected value becomes

$$E(V_0(D_M)) = qV_{0,M1}(D_M) + (1-q)V_{0,M2}(D_M) \quad (4.40)$$

- **In the case of high dividends:**

Given that manager announces medium dividends, his perceived payoff is

$$E(\hat{\Pi}^M(D_H)) = q\hat{\Pi}_{M1}^M(D_H) + (1-q)\hat{\Pi}_{M2}^M(D_H) \quad (4.41)$$

Firm expected value becomes

$$E(V_0(D_H)) = qV_{0,M1}(D_H) + (1-q)V_{0,M2}(D_H) \quad (4.42)$$

4.6.1 Numerical examples

This section numerically illustrates how managerial bounded rationality could have an impact on his expected payoff which perhaps leads manager to change the choice of dividends announcement. The parameter values are: $q \in [0,1]$; $\hat{\gamma}_1 = \hat{\gamma}_2 = \hat{\gamma}_q \in [0,1]$; $\gamma_1 = \gamma_2 = 0.1$; $\alpha = 0.1$; $R_H = 1000$; $R_L = 100$; $I = 50$; $X = 100$; $B = 40$; and $c = 20$.³⁰

Note that $q = 1$ represents a case where manager is fully understand that he uses dividends announcement to commit to high current effort (as in Model 1) whilst $q = 0$ demonstrates a case where manager is overconfident about his future ability to affect the success of future project (as in Model 2). These two cases reveal that the manager has no bounded rationality. However, managerial bounded rationality exists when manager does not have sufficient information to decide whether he uses dividend announcement to commit a high current or future effort. Thus, the limited information that manager has lead him to form his expectation based on the two payoffs from Models 1 and 2: $0 > q > 1$.

Table 4.8 summarises managerial decision on dividend announcement level and firm expected value for a given level of overconfidence $\hat{\gamma}_q \in [0,1]$ and $q \in [0,1]$. Each panel reports the optimal dividend level that manager chooses in order to maximise his expected payoff, i.e., $Max(E(\hat{\Pi}^M | D_{i \in \{L,M,H\}}))$. The second row of each panel presents that best dividend decision that manager should take in order to maximise firm value, i.e., $Max(E(V_0 | D_{i \in \{L,M,H\}}))$.

³⁰ Those parameters are the same as in Models 1 and 2.

Panel A of Table 4.8 shows that when $q=1$, the manager is fully understand that he use dividends to commit to higher current effort (as in Model 1). Thus, there is no bounded rationality in this case. Manager will never announce high dividends as this announcement yields manager with the lowest payoffs. At low level of overconfidence $0.3 > \hat{\gamma}_q \geq 0.1$, managers chooses low dividends due to the high expected payoff that the manager could obtain from this announcement and firm value is higher under this announcement. At level of overconfidence where $\hat{\gamma}_q \geq 0.3$, manager switches from low to medium dividends at which the firm value is lower under medium dividend announcement that it would be under the low dividend announcement at the overconfident level $0.4 \leq \hat{\gamma}_q < 0.6$. Manager continues to choose medium dividends when $\hat{\gamma}_q \geq 0.6$ where firm value is higher than under the low dividends (for more details see appendix A).

Panel B shows the case where managerial bounded rationality exists in the form that his expected payoff is generated based on probability of $q = 0.9$ to Model 1. The results show that again manager will never choose high dividend announcement. At low level of overconfidence $0.3 > \hat{\gamma}_q \geq 0.1$ manager's expected payoff is higher under the announcement of low dividends and firm value is greater under this announcement than it would be under other dividend announcements. For a level of overconfidence ($\hat{\gamma}_q = 0.3$), the expected payoff of manager is the same under the announcement of low and medium dividends representing the critical value, however, firm expected value is higher under the announcement of the former. Manager switches from low to medium dividend when the overconfident parameter exceeds 0.3 (i.e., $0.9 \geq \hat{\gamma}_q > 0.3$). However, firm expected value continues to be lower under the announcement of medium dividend for an overconfident level $0.6 \geq \hat{\gamma}_q > 0.3$. At a high level of managerial overconfidence $\hat{\gamma}_q \geq 0.6$, the expected firm value is higher under this announcement than it would be under the announcement of low dividends (for more details see appendix B).

Panel C shows the case where manager still assigns more probability to the first regime, i.e., $q = 0.8$. Comparing manager's expected payoffs from the three dividend announcements reveal that the decision to announce high dividend is dominated. Thus, the manager announces either low or medium dividends.

Table 4.8: The relationship between managerial overconfidence, bounded rationality, dividend policy and firm value

Panel	$\hat{\gamma}_q \in [0.1, 0.9]$		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
	$q \in [0, 1]$										
A	1	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	$D_L = D_M$	D_M	D_M	D_M	D_M	D_M	D_M
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	D_L	D_L	D_L	D_M	D_M	D_M	D_M
B	0.9	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	$D_L = D_M$	D_M	D_M	D_M	D_M	D_M	D_M
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	D_L	D_L	D_L	D_M	D_M	D_M	D_M
C	0.8	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	$D_L = D_M$	D_M	D_M	D_M	D_M	D_M	D_M
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	D_L	D_L	D_L	D_M	D_M	D_M	D_M
D	0.7	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	$D_L = D_M$	D_M	D_M	D_M	D_M	D_M	D_M
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	D_L	D_L	$D_L = D_M$	D_M	D_M	D_M	D_M
E	0.6	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	$D_L = D_M$	$D_L = D_M$	D_M	D_M	D_M	D_M	D_M
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	D_L	D_L	D_M	D_M	D_M	D_M	D_M
F	0.5	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	$D_L = D_H$	D_L	$D_L = D_M$	$D_L = D_M$	D_M	D_M	D_M	D_M	D_M
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_L	D_L	D_L	D_L	D_M	D_M	D_M	D_M	D_M
G	0.4	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_H	D_L	D_M	D_M	D_M	D_M	D_M	D_M	D_M
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_H	D_H	D_L	D_M	D_M	D_M	D_M	D_M	D_M
H	0.3	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_H	D_H	D_M	$D_M = D_L$	$D_M = D_L$	$D_M = D_L$	$D_M = D_L$	$D_M = D_L$	D_L
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_H	D_H	D_H	D_M	D_M	D_M	D_M	D_M	D_M

Table 4.8: Continue...

Panel	$\hat{\gamma}_q \in [0.1, 0.9]$		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
	$q \in [0, 1]$										
I	0.2	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_H	$D_H = D_M$	D_M	$D_M = D_L$	$D_M = D_L$	D_L	D_L	D_L	D_L
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_H	D_H	D_H	$D_H = D_M$	D_M	D_M	D_M	$D_M = D_L$	D_L
J	0.1	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_H	D_H	$D_H = D_M$	$D_M = D_L$	D_L	D_L	D_L	D_L	D_L
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_H	D_H	D_H	D_H	$D_H = D_M$	D_M	D_L	D_L	D_L
K	0	$Max(E(\hat{\Pi}^M \mid D_{i \in \{L, M, H\}}))$	D_H	D_H	$D_H = D_M$	$D_M = D_L$	D_L	D_L	D_L	D_L	D_L
		$Max(E(V_0 \mid D_{i \in \{L, M, H\}}))$	D_H	D_H	D_H	D_H	D_H	D_H	D_L	D_L	D_L

This table presents manager decisions on the level of dividend: $Max(E(\hat{\Pi}^M | D_{i \in \{L, M, H\}}))$, and the optimal decision that the manager should take to maximise firm's value: $Max(E(V_0 | D_{i \in \{L, M, H\}}))$, for a given level of $\hat{\gamma}_q$ and q .

This numerical illustration demonstrates that at low level of managerial overconfidence, i.e., $0.3 > \hat{\gamma}_q \geq 0.1$, manager chooses to announce low the dividend as it yields more payoff and firm value is higher under this announcement. The level of overconfidence equals to 0.3 (i.e., $\hat{\gamma}_q = 0.3$), represents the critical level of overconfidence at which his expected payoff from announcing low and medium dividends are the same. Beyond the critical value (i.e., $0.9 \geq \hat{\gamma}_q > 0.3$) manager's expected payoff is higher under the announcement of medium dividends which leads him to switch his announcement to this level: announcing medium dividends. The firm expected value drops and continues to be lower under this announcement that it would be under the announcement of low dividends for a level of overconfidence $0.6 > \hat{\gamma}_q > 0.3$. When the overconfident level equals or above 0.6 (i.e., $\hat{\gamma}_q \geq 0.6$), firm's expected value is higher under this announcement (for more details see appendix C).

In Panel D of Table 4.8, the manager continues to put more weight on Model 1 (i.e., $q = 0.7$). The results reveal that, again, manager will never chose to announce high dividend. For a range of managerial overconfidence between 0.1 and 0.3 (i.e., $0.1 \geq \hat{\gamma}_q \geq 0.3$) manager announces low dividend and he switches to medium dividend when the level of overconfidence exceeds 0.3 (i.e., $\hat{\gamma}_q > 0.3$). Similar to Panel A to C, the critical level of overconfidence is 0.3. Furthermore, the firm expected value is higher under the low dividend announcement. Hence, by announcing low dividends manager's payoff and firm expected value is greater than announcing medium or high dividends. However, at the level of overconfidence, i.e., $0.6 > \hat{\gamma}_q \geq 0.4$, where manager has already switched to medium dividends, the expected firm value is lower under this announcement than it would be under the announcement of low dividends. The level of overconfidence that is equal to 0.5 the expected value of the firm is the same under the announcement of low and medium dividends. However, at a high level of managerial overconfidence (i.e., $\hat{\gamma}_q \geq 0.6$) firm value is higher under the announcement of medium dividend that it would be under low dividend announcement (for more details see appendix D).

When manager assigns probability of 0.6 (i.e., $q = 0.6$) to Model 1 as in Panel E, he will never choose to announce high dividends: high divided announcement is dominated. For a level of overconfidence ($0.3 > \hat{\gamma}_q \geq 0.1$) manager chooses to announce low dividend because this announcement yields more expected payoff to the manager. Further, firm expected value is higher under this announcement than under the medium dividend announcement. Interestingly, at an overconfidence level ($0.4 \geq \hat{\gamma}_q \geq 0.3$) manager expected payoffs are the same from announcing low or medium dividend, while the expected firm value is higher under the low dividend announcement than it would be under the announcement of medium dividends. This represents a situation where manager is indifferent between announcing

low or medium dividend. Given that manager is more reluctant to change dividend and there is no additional payoff he could obtain from changing dividend level, he is more likely to continue announcing low dividends. Manager switches from low to medium dividend at an overconfidence level greater than 0.4 (i.e., $\hat{\gamma}_q > 0.4$) to maximise his expected payoff and this improving firm expected value. Overall, this example shows that although manager decides the level of dividends to maximise his payoff, he is also works unintentionally toward maximising shareholder value (for more details see appendix E).

This illustration shows that manager's expected payoff is generated equally by Models 1 and 2 (i.e., $q = 0.5$). Unlike the previous examples (Panels A to D), Panel F reveals that manager might consider the announcement of high dividend at a very low of managerial overconfidence (i.e., $\hat{\gamma}_q = 0.1$). In this case, manager maximises his expected payoff by either announce low or high dividends while firm value is higher under the announcement of the former. For a level of overconfidence ($0.3 > \hat{\gamma}_q > 0.1$), manager chooses to announce low dividends as it yields more expected payoff and this announcement increases firm expected value. At a level of managerial overconfidence ($0.4 \geq \hat{\gamma}_q \geq 0.3$), interestingly, manager's expected payoff is identical under the announcement of low or medium dividends. However, firm expected value is higher under the announcement of low dividends. As $\hat{\gamma}_q > 0.4$, medium dividend announcement seems to be the best choice for manager in order maximises his expected payoff and this rises the expected value of the firm (for more details see appendix F).

Panel G reveals that, interestingly, in the case manager assigns more weight of being under regime 2: Model 2 (i.e., $q = 0.4$), none of the dividend announcement levels are dominated. As $\hat{\gamma}_q = 0.1$, manager chooses to announce high dividend as it yields more expected payoff and firm expected value is higher under this announcement compared with the announcement of low or medium dividends. The manager switches to low dividend announcement at a level of overconfidence equal to 0.2, while this reducing firm expected value. At an overconfidence of 0.3, manager, again, switches to announce medium dividends in order to maximise his payoff while this decision drops firm expected value. As $\hat{\gamma}_q > 0.3$, manager continues to announce medium dividends and firm expected value increases (for more details see appendix G).

Table 4.8, Panel H illustrates a case where manager assigns a probability of 0.7 as being in regime 2 (Model 2). Low overconfident manager announces high dividend ($0.2 \geq \hat{\gamma}_q \geq 0.1$) due to his expected payoff. Manager switches to medium dividend announcement when $\hat{\gamma}_q = 0.3$, while this reducing firm expected value. For a level of overconfidence ($0.8 \geq \hat{\gamma}_q \geq 0.4$), manager expected payoff from the

announcement of medium and low dividends are the same. However, firm value is higher if he continues to announce medium dividends. At a high level of overconfidence, $\hat{\gamma}_q = 0.9$, manager switches from medium to low dividends while this leads a drop in firm expected value (for more details see appendix H).

In Panel I manager assigns probability of 0.8 to regime 2, i.e., Model 2. The numerical example reveals that at a level of overconfidence equals to 0.1 managers maximises his expected payoff from announcing high dividends. When overconfidence level is equal to 0.2 (i.e., $\hat{\gamma}_q = 0.2$), manager expected payoff from announcing high or medium dividend is the same, representing a critical value. Manager switches to medium dividend announcement at overconfident level equals to 0.3, while this switching reduces firm value. For a level of overconfidence ($0.5 \geq \hat{\gamma}_q \geq 0.4$), manager expected payoff from announcing medium or low dividend are identical: revealing another critical point. When an overconfident level is in the range of $0.7 \geq \hat{\gamma}_q \geq 0.6$, manager switches from medium to low dividend announcement, while this drops firm expected value. As $\hat{\gamma}_q > 0.7$ manager continues to announce low dividend and firm expected value increases (for more details see appendix I).

The example represents a case where manager believes that he is more likely to work under regime 2 by assigning probability of 0.9 to Model 2 is presented in Panel J of Table 4.8. The results show that manager announces high dividends at an overconfident level $0.1 \geq \hat{\gamma}_q > 0.3$. The critical value is shown at an overconfident level equals to 0.3, where the announcement of high or medium dividend yield the same expected payoff to the manager. Further, when $\hat{\gamma}_q = 0.4$ manager never chooses high dividend announcement, and he can shift to either medium or low dividend announcement as they obtain the same expected payoff. The switching from high dividend, to the medium or low dividends, reduces firm expected value. At a level of overconfidence $0.6 \geq \hat{\gamma}_q \geq 0.5$, manager announces low dividend while this drops firm expected value. As $\hat{\gamma}_q > 0.6$ manager continues to choose low dividend announcement, while this continuation increases the expected of firm value (for more details see appendix J)

Panel K shows that manager has no bounded rationality, i.e., $q = 0$. The example illustrates a case where manager is fully understand that he works under regime 2. The manager will never choose medium dividend announcement. Manager obtains maximum payoff from announcing high dividend for an overconfident level $0.3 \geq \hat{\gamma}_q \geq 0.1$ while firm expected value is higher under this announcement. Over the range of overconfidence $0.6 \geq \hat{\gamma}_q > 0.4$ manager announces low dividends and this reducing

firm expected value. At an overconfidence level $\hat{\gamma}_q \geq 0.7$ manager continues on announcing low dividend and firm expected value is higher than would be under the medium or high dividend (for more details see appendix K).

Overall the results in Table 4.8 demonstrate the impact of bounded rationality of overconfident managers on dividend policy. The study of Brav et al. (2005) reports that firm's dividend policy varies across firms, in spite of the extensive research on this area. This example reveals that bounded rationality and overconfidence of a manager might provide additional explanation to the variation in dividend policy.

4.7 Conclusion

This chapter presents theoretical models on the relationship between managerial overconfidence and corporate dividend policy. The recent theoretical studies provide inconclusive results on the impact of managerial overconfidence on dividend. Wu and Liu (2008) demonstrate that CEO overconfidence leads to an increase in dividends, while Deshmukh et al. (2013) show that managerial overconfidence tends to reduce dividends.

This study aims to address this gap by showing under which conditions the relationship between managerial overconfidence and dividend can be positive or negative. The paper demonstrates that CEO overconfidence increases dividends when he is overconfident about his current ability (in line with Wu and Liu, 2008). This leads an overconfident manager to announce sufficiently high dividends to commit to investors that he will exert high effort on the current project. The second model shows that when an overconfident manager exerts effort on a future project, dividends become negatively correlated with overconfidence (consistent with Deshmukh et al., 2013).

This chapter further investigates the impact of managers' and investors' bounded rationality on the relationship between overconfidence and dividends. The findings demonstrate that bounded rationality could influence the relationship between overconfidence and dividends. The next chapter will empirically investigate the relationship between managerial overconfidence and corporate dividend policy in the UK.

Chapter 5: Managerial Overconfidence, Payout Policy and Corporate Governance: Evidence from UK Companies³¹

5.1 Introduction

Although many theoretical and empirical studies have been carried out over the last six decades, explanations for the variations in dividend policy over time and across firms remains unresolved (Brav et al., 2005). Under the assumption of managers' and investors' rationality, the earlier studies show that dividends can be used as a signalling device (e.g., Miller and Rock, 1985); and to mitigate the problem of free cash flow (e.g., Easterbrook, 1984; Jensen, 1986). When investors are irrational and managers are rational, Baker and Wurgler (2004) demonstrate that rational managers cater for investors demands for dividends when those investors place a premium on dividend paying firms. On the other hand, Breuer et al. (2014) reveal the importance of behavioral patterns of investors, such as bounded rationality, patience and loss aversion regarding their dividend preferences.

The research on the link between managerial overconfidence and payout policy has been a recently emerging area, and hence understudied. In the US, Cordeiro (2009) shows that overconfidence is negatively correlated with the propensity to pay dividends, but not with the amount of dividends, when using exercisable stock options to proxy managerial overconfidence. Using the same sample and measure of overconfidence, Deshmukh et al. (2013) find a negative association between overconfidence and the level of dividends. Wu and Liu (2008) theoretically demonstrate that overconfident managers are more likely to increase dividends.

As a consequence, this chapter analyses the impact of overconfidence on both the level of dividends and the propensity of firms to pay dividends, as well as the share repurchase policies in the UK, using various proxies to quantify these policies. To the best of my knowledge, this study is the first that examines the association between overconfident CEOs and payout policy outside of the US³², focusing on the more recent period of 2000-2012. The data has been collected from firms' annual reports and other databases, which enables us to obtain a wide range of corporate governance information and CEO

³¹ We would like to thank participants at the 50th FEBS Conference; and the 50th British Accounting and Finance Association (BAFA) Conference for their valuable comments and suggestions.

³² The literature (see e.g., Aguilera et al., 2006, Farinha, 2003, Franks et al., 2009, Pinkowitz et al., 2006 and Yoshikawa et al., 2014) reveals that there are clear differences between the US and the UK regarding corporate governance systems, executive compensation policies, cash flow and voting rights, board structure and ownership structure, which has implications on issues such as the severity of agency conflicts (free cash flow problems), signalling mechanisms and monitoring of management. The literature implies that the UK has stronger corporate governance mechanisms with higher influence of institutional investors and has stronger chairmen, compared to the US (see Denis and McConnell, 2003 and references therein). These issues are not independent from how CEOs determine their corporate payout policies. Probably as a reflection, when our UK results are compared to those of Deshmukh et al. (2013) for US firms, we observe salient differences, which we highlight throughout the paper.

characteristics, in addition to firm level factors that have not yet been considered when investigating the influence of overconfident CEOs on payout policy in the earlier studies.

These findings make several contributions to the existing literature. Firstly, this study is the first paper that considers the effect of overconfident CEOs on payout policy in the UK. I show that overconfident managers affect the level of, and the propensity to pay dividends. That is, firms with overconfident CEOs pay less and are more likely to reduce dividends compared to those managed by non-overconfident peers. This key finding is robust to alternative measures of dividend policy, as well as considering a number of control variables and different model specifications. The results also reinforce the importance of firm characteristics in determining corporate dividend policy in the UK. That is, dividends are positively correlated with size, profitability and cash flow; and negatively correlated with leverage and investment.

A second contribution is that, whilst the literature mostly links firm undervaluation to share buybacks and generally argues that undervaluation is one of the major determinants of share repurchases, virtually no attention has been paid to its effect on corporate dividend policy. In fact, this study is the first that associates undervaluation of company shares with dividend policy and demonstrates that undervaluation could be considered as an additional factor that influences dividend policy. Specifically, we show that firms with a potential for undervaluation pay less dividends and the likelihood of firms to pay dividends is decreased in such firms.

Moreover, neither the amount of, nor the propensity to pay dividends in the UK is affected by the dividend premium, which is inconsistent with the catering theory of dividends (Baker and Wurgler, 2004). Also, corporate governance factors (e.g., board size, institutional holdings and ownership concentration) are shown to have a positive impact on the level of dividend payments. However, none of these factors influences the propensity of firms to pay dividends. Additionally, we show that CEO characteristics, such as age and time in role, can also affect the amount of, and the propensity to pay dividends.

This paper further investigates the influence of managerial overconfidence on the relationship between dividends and firm-specific factors (i.e., cash flows, profitability, and growth). The findings reaffirm the result that when managerial overconfidence is not considered, higher cash flows lead to higher dividend payments. However, the presence of overconfident CEOs reduces this positive association (in contrast to Deshmukh et al., 2013). This suggests that overconfident CEOs in the UK may prefer to accumulate more cash to avoid relying on external finance (Malmendier and Tate, 2005a; Hackbarth, 2008) and hence distribute less dividends. A similar result is obtained for the effect of CEO

overconfidence on the relationship between dividend policy and profitability. Additionally, I show a negative association between dividends and firm growth. However, this link is statistically insensitive to managerial overconfidence, and again contradicts the findings of Deshmukh et al. (2013) in the US. Furthermore, I find that CEOs stock ownership and option holding are insignificantly correlated with the amount of, and the propensity to pay dividends (which is inconsistent with the empirical findings of Deshmukh et al., 2013).

The results also show that overconfident managers in undervalued firms reduce dividends less compared to when managers are rational for the same types of firm. This finding seems to go against the argument that overconfident CEOs always believe that their stocks are undervalued, even if they are not (e.g., Malmendier and Tate, 2005a; Hackbarth, 2008) and hence reduce dividends further.

Moreover, the impact of CEO overconfidence on the relationship between dividends and corporate governance (i.e., board size, ownership concentration and institutional holdings) is examined. The results suggest that board size is positively linked with dividends, which is consistent with earlier studies. However, this association appears statistically to be the same in firms managed by moderate and overconfident managers. Also, the findings reveal that ownership concentration and institutional holdings have a positive impact on the amount of dividends. Interestingly, this relationship is stronger in firms with overconfident CEOs. These results suggest that investors with large ownership and high institutional holdings may force overconfident managers to distribute excess cash to avoid the overinvestment problems of free cash flow (Jensen, 1986). Finally, our empirical analysis suggests that higher managerial overconfidence leads to more frequent share repurchases and higher amounts spent on share buybacks, the effect being statistically significant for the former. Similarly, the effect of overconfidence on overall payout policy is negative in terms of its presence and the amount of total payouts but whether this inverse relationship is statistically significant depends on how we measure this policy.

This chapter is organized as follows. Section 5.2 briefly discusses the relevant literature. Section 5.3 presents the development of hypotheses along with variable definitions. Data collection and univariate analysis are discussed in section 5.4. and the methodology is described in section 5.5. Section 5.6 reports the empirical results and various robustness checks. In section 5.7, we provide further evidence of robustness by considering share buybacks and total payout policies. Section 5.8 concludes the chapter.

5.2 Literature review

Although dividend policy has been extensively studied, its variations over time and across firms remains unexplained (Brav et al., 2005). For example, the signalling theory suggests that dividends are used as a communication device between insiders and outsiders (Bhattacharya, 1979; John and Williams, 1985; Miller and Rock, 1985). Much of the research supports this proposition when testing stock market reactions to dividends changes (e.g., Pettit, 1972; Charest, 1978; Asquith and Mullins, 1983; Bajaj and Anand, 1995). However, studies of the relationship between dividend changes and future earnings produce mixed conclusions.³³

According to agency theory (Jensen and Meckling, 1976), dividend policy can potentially align the interests of managers to those of shareholders. Managers distribute dividends as a commitment not to use firms' free cash flows for private benefits, to eliminate the overinvestment problem and to seek external funds for financing new projects, which imposes further monitoring by the capital markets (e.g., Rozeff, 1982; Easterbrook, 1984; Jensen, 1986; Jensen et al., 1992).

Other studies also investigate the link between corporate governance and dividend policy, arguing that strong corporate governance should mitigate agency problems through encouraging managers to pay more dividends (e.g., Rozeff, 1982; Dempsey and Laber, 1992; Holder et al., 1998; Michaely and Roberts, 2012). However, Grinstein and Michaely (2005) find that institutional holdings are not related to dividend policy, and dividends are not used by institutions to control and monitor management actions (this is consistent with the results of Brav et al., 2005).³⁴

In the behavioural finance literature, the catering theory of dividends suggests that firms change their dividend policy according to the shareholders' demand for dividends (Baker and Wurgler, 2004; Li and Lie, 2006). However in contrast to these studies, Denis and Osobov (2008) find weak support for the catering theory outside of the US.

Studies have also shown that managerial incentives are related to corporate payout policy (e.g., Lambert et al., 1989; Jolls, 1998; Weisbenner, 2000; Fenn and Liang, 2001). Managerial cash incentives are found to be positively associated with higher payouts (Lewellen et al., 1987), while managerial stock options are found to be negatively correlated with dividends (Lambert et al., 1989; Liljeblom and Pasternack, 2006). Fenn and Liang (2001) and Aboody and Kasnik (2001) show that

³³ Gonedes (1978), DeAngelo et al. (1996), Benartzi et al. (1997) and Grullon et al. (2005) find that dividend changes have no power to predict future earnings. However, in line with the signalling hypothesis, Nissim and Ziv (2001), Chen and Wu (1999), Harada and Nguyen (2005) and Stacescu (2006), find a positive correlation between dividend changes and future earnings.

³⁴ Brav et al., 2005 show that about 87% of executives do not agree with the use of dividend policy as a means of imposing self-discipline.

CEOs with stock options are more likely to favour share repurchases over dividends. Cuny et al. (2009) report a negative relationship between executive stock options and total payouts.

Some recent literature on behavioural corporate finance shows that managerial psychological biases, such as overconfidence, affect investments and capital structure decisions (e.g., Heaton, 2002; Malmendier and Tate, 2005a, 2008; Doukas and Petmezas, 2007; Croci et al., 2010; Malmendier et al., 2011).

The research on managerial overconfidence and dividends has only recently emerged, and as yet is little understood. Cordeiro (2009) empirically investigates the effect of irrational managers on dividend policy in the US during 1984-1994, and shows that overconfident CEOs are less likely to pay dividends. However, he finds no evidence of the impact of overconfident managers on the amount of dividends. Using the same data and measures of overconfidence, Deshmukh et al. (2013) show that overconfident CEOs pay less dividends. Wu and Liu (2008) theoretically demonstrate that overconfident managers are more likely to increase dividends due to the overestimation of cash flows from current investments.

5.3 Hypothesis development

This section develops hypotheses drawn from the literature review discussed in Chapter 2. The academic literature suggests that firm characteristics, corporate governance, managerial cognitive/psychological biases and CEO traits have explanatory power in determining corporate dividend policy. The empirical predictions of the link between the above factors and dividend policy are developed in this section. In addition, the variable definitions are also given. In the following sections the developed hypotheses will be empirically examined.

5.3.1 Managerial overconfidence

With reference to the earlier review in Chapter 2 (section 2.4.2) which concluded that overconfident managers are more likely to do the following: overinvest due to overestimation of the project quality (Deshmukh et al., 2013), overestimate a firm's value and hence view external finance as costly (Hackbarth, 2008; Malmendier et al., 2011), engage more in mergers and acquisitions (Doukas and Petmezas, 2007; Malmendier and Tate, 2008), invest more in innovation (Hirshleifer et al., 2012).

These findings suggest that overconfident managers are more likely not to pay or reduce cash dividends in order to accumulate cash for future investment. Therefore, we hypothesise that overconfident managers are less likely to pay dividends and more likely to pay less dividends compared to rational managers.

5.3.1.1 Overconfidence measures

This study captures managerial overconfidence through using the well-documented measure of managerial overconfidence found in the literature (Malmendier and Tate, 2008; Croci et al, 2010; Andriosopoulos et al., 2013)³⁵, which is based on the timing of the option exercises by firms' CEOs. CEOs are classified as overconfident if they continue holding exercisable options that are in the money (at least 40% in the money) to the year-end before the expired year. Non-overconfident CEOs are those who fail to fulfil this condition.

The intuition behind using this proxy is that risk averse and undiversified CEOs should not hold their options until expiration (Carpenter, 1998; Hall and Murphy, 2002). Furthermore, a firm's board prohibits its CEO from hedging the company's stock options through short-selling and imposes a restriction on trading in them. Also, CEOs invest their human capital in their firms, and consequently they are highly exposed to firm-specific risks. Hence, it is advisable that CEOs reduce their exposure to firms' risks by exercising options early, especially if they are sufficiently in the money. In contrast, if CEOs keep holding their exercisable options when they are sufficiently in the money until the final year, this indicates confidence in the future prospects of the companies that they manage.

In the UK, information on a CEO's stock options has been disclosed in the annual report since 1997. In most cases, the life of a CEO's granted options is about 10 years, and becomes vested at the beginning of year 4. Also, the board's committee imposes some restrictions on exercising the vested options based on certain conditions (e.g., EPS and growth rate).³⁶ Thus, we classify options as exercisable if they meet two conditions: those options are vested and meet the exercise restrictions.³⁷

Following Malmendier and Tate (2008) overconfidence is defined as a binary variable that is equal to 1 (for all CEO-years) if the CEO holds, at least once during his tenure, exercisable options that are sufficiently in the money, meaning at least 40% in the money, to the final year before the year of expiration. Further, the overconfidence measure is split into two other indicators, post-holder and pre-holder, to allow for time variation over the sample period, and to eliminate forward looking information in the classification of a CEO (Malmendier and Tate, 2008; Deshmukh et al., 2013). A post-holder is defined by a dummy variable that is 1 in all CEO-years after the CEO, for the first time, holds an option

³⁵ Croci et al. (2010) and Andriosopoulos et al. (2013) use UK data to construct this measure

³⁶ The four times emoluments rule in the UK restrict the value of options held by CEOs to four times (base salary plus bonus) (Kyriacou et al., 2010). However, this would not have an impact on our measure of managerial overconfidence. Specifically, our measure depends on whether a CEO holds in the money options (even a signal option) to the last year before expiration year (see Malmendier and Tate, 2008).

³⁷ We find many cases where options were vested but cannot be exercised by CEO due to the fact that CEO does not meet firm's restriction on those options. In this case we classify those options as non-exercisable.

package until the expiration. A pre-holder is an indicator variable that is 1 if overconfidence is equal to 1 and a post-holder is equal to 0.

5.3.2 CEO traits

Earlier studies have shown that CEO power, age and nationality affect corporate financial policy (e.g., Malmendier et al., 2011; Cronqvist et al., 2012).³⁸ As an extension of this finding, it could be argued that overconfident CEOs with more power are more likely to reduce dividends since they believe their firms are undervalued, perceive external finance as costly and overestimate the quality of future projects. The CEO power is captured by the CEO's time in the role (measured as the number of years that the CEOs have served in their position) and CEO tenure (measured as number of years that the CEO has worked in the firm).

Moreover, the dummy variable, 'Founder', is included which is equal to one if the CEO is the firm's founder and 0 otherwise. Furthermore, as this study focuses on listed firms in the UK, a dummy variable of the CEO's nationality is considered which takes the value of 1 if the CEO has British nationality and 0 otherwise, similar to the recent study of Andriosopoulos et al. (2013).

5.3.3 Corporate governance

5.3.3.1 Board structure

Section 2.3.2.1 reviews the literature on the crucial role of the board size and board composition in aligning the manager's interest to those of shareholders, which in turn mitigates the free cash flow problems, however, no conclusion is made with regard to the association of these factors with dividend policy. Thus, this study has no clear prediction on the link between board size and board composition, and dividend policy. In this study board size is measured as the sum of outside and inside directors on the board, while board composition is defined as the fraction of outside directors with regard to the total number of board members (Veprauskaitė and Adams, 2013).

5.3.3.2 Ownership structure

Ownership structure (i.e., ownership concentration and institutional holdings) are shown to have a significant impact on monitoring internal management and influencing corporate financial policy.³⁹ Thus, we expect a negative correlation between dividends and ownership concentration, and dividends and institutional investors. Ownership concentration is measured by the sum of the stake of all shareholders with ownership greater than 3% (Veprauskaitė and Adams, 2013). Institutional holdings

³⁸ As discussed in Chapter 2 section 2.3.1.

³⁹ As discussed in Chapter 2 section 2.3.2.2.

are measured by the sum of the stake of all institutional holding (greater than 3%) scaled by the firms' total shares outstanding (Grinstein and Michaely, 2005).

5.3.4 Firm characteristics

5.3.4.1 Potential undervaluation

Recent studies examining the impact of managerial overconfidence on payout policies assume that overconfident managers believe their firms to be undervalued (e.g., Cordeiro, 2009; Burg et al., 2012; Deshmukh et al., 2013).⁴⁰ However, none of these studies have paid attention to the influence of overconfidence on payout policy in firms with a potential for undervaluation. The influence of managers with an overconfidence bias on dividend policy should be more apparent in undervalued than non-undervalued firms. Overconfident managers tend to believe their firm to be undervalued, although it may not be the case. Then it would be expected that the influence of managerial overconfidence on dividend policy is more apparent for firms that are undervalued at low levels compared to the same type of firms with rational managers. Following Gong et al. (2008), Barth and Kasznik (1999) and Chan et al. (2010), the ratio of book equity to market equity is used as an undervaluation proxy in this study.

5.3.4.2 Ownership of stocks and options by CEOs

The studies on the relationship between CEO stock and options ownership, and payout policy reveal mixed conclusions (as in Chapter 2 section 2.2.3). CEO stock ownership is measured as the total stock owned by the CEO as a fraction of total stocks in issue, while CEO option ownership is measured as the total number of exercisable options held by the CEO relative to the total stocks in issue (Deshmukh et al., 2013).⁴¹

5.3.4.3 Other firm characteristics

The literature (e.g., Fama and French, 2001, 2002; Denis and Osobov, 2008) affirms that some firm-specific factors such as size, profitability, cash flow, growth, investment and leverage affect dividend policy. The firm size measure is based on either total sales (*Size (Sales)*) as in Denis and Osobov (2008) or total assets (*Size (Assets)*) as in Fama and French (2001), which is expected to be positively related to dividend payments. We measure profitability (*ROA*) as the ratio of earnings before interest but after

⁴⁰ As discussed in Chapter 2 section 2.4.2.2.

⁴¹ We also tested for the presence of such a non-linear relationship regarding stock and options ownership but obtained insignificant coefficients. However, it should be noted that Farinha (2003) uses share ownership by all directors and families as a proxy for insider ownership whereas we use only CEOs' ownership of stock or options.

tax to total assets, and expect it to positively affect dividends. Cash flow (*Cash Flow*) is measured as the ratio of pre-tax profits plus depreciation to total assets. Firms with a high cash flow are expected to pay more dividends. *Leverage* is measured as the ratio of total debt to total assets and it is expected to have a negative link with dividends due to its role in mitigating agency conflicts (e.g., Margaritis and Psillaki, 2010). The growth rate (*Current Growth*) is measured as the percentage change in total assets, following Fama and French (2001) and Denis and Osobov (2008). It is expected that growth is negatively related to dividend policy. *Investment* is measured as the ratio of the sum of capital expenditure plus research and development to total assets (Deshmukh et al., 2013). Investment spending is expected to have an inverse relationship with the dividend payments.

Following Deshmukh et al. (2013), the level of asymmetric information is measured by *Tangibility*, which is fixed assets scaled by total assets (higher tangibility implies lower information asymmetry). Signalling theory suggests that firms with more asymmetric information should pay higher dividends.⁴² Furthermore, there is no clear prediction on the link between the dividend payment and dividend premium outside the US.⁴³ The *Dividend Premium* is measured by the natural logarithm of the average market-to-book ratio of dividend payers minus non-dividend paying firms (Baker and Wurgler, 2004).

5.4 Data

5.4.1 Sample construction

The initial sample covers all non-financial firms in the FTSE All Share Index from 1997 to 2012.⁴⁴ Firms not using stock options as a part of CEO compensation package are excluded. Information on the number of CEOs granted stock options, the date they were granted, and the strike/exercise price are essential components for the construction of the *Overconfidence* measure (Malmendier and Tate, 2008).

A very similar proxy can be constructed using the ExecuComp database (see Campbell et al., 2011; Malmendier et al., 2011; Hirshleifer et al., 2012). However, this database does not cover firms in the UK. To the best of our knowledge, the only database that provides such information for UK firms is *BoardEx*. However, this source covers the period starting from 1999 and there is a significant amount of missing data. For example, for all firms in the FTSE All Share Index from 1999 to 2012 we could obtain approximately 530 firm-year observations. We overcome this limitation through using company

⁴² However, Deshmukh et al. (2013) find that firms with low asymmetric information pay higher dividends, which is consistent with Myers and Majluf (1984) and Li and Zhao (2008).

⁴³ See Chapter 2 section 2.1.3.6.

⁴⁴ Banks, insurance firms and other financial firms are excluded from the study sample due to their difference in the financial reporting standards from the rest of the sample. Further, utilities firms are excluded because their payout policies and the access to external financing are regulated (Renneboog and Trojanowski, 2011).

annual reports. This information is collected from annual reports for the years 1997 to 2012. The annual reports are either found on Northcote Internet⁴⁵ or on the company's website. For firms with no annual reports, a direct request (by phone or email) was made to them to provide their annual reports in either hard or soft copy format. The initial sample consists of 588 firms. 219 firms from the financial, insurance and investment trust sectors are excluded. A further 266 firms were dropped as they had no options data or no data for over a one year for any of the variables. All (non-dummy) variables are winsorized at 1% and 99% to eliminate outliers. The final sample consists of 103 non-financial companies with 972 firm-year observations. Table 5.1 provides the definitions of the variables and the data sources.

5.4.2 Descriptive statistics

Table 5.2 shows the descriptive statistics for the variables, and the frequency of overconfidence across years. Panel A reports five different measures of dividend policy as well as proxies for the policies of share buybacks and total payouts. It shows that UK firms distribute the equivalent of 2.9% of their total assets as cash dividends (*Dividends/TA*). The average dividend yield (*Dividends/MV*) is about 3%, which indicates that firms pay 3% relative to the share price as dividends. Also, firms distribute around 35% of their earnings as dividends (*Dividends/Earnings*), which is similar to Chay and Suh's (2009) UK study for the period 1994-2005. On the other hand, repurchases (total payouts) are, on average, 1% (4%) of total assets, and 6% (30%) of earnings.

Panel B, Table 5.2 presents firm characteristics that have been documented in the literature to influence dividend policy decisions. The entire sample covers a wide range of firm sizes with a mean (median) of 13.2 (13.1). The cash flow (*Cash Flow*) is about 13% and profitability (*Profitability*) is around 14%. The undervaluation indicator, which is the ratio of total assets to the market value of equity, is approximately 70%, which is close to Jategaonkar's (2013) finding for US firms.

The corporate governance factors are shown in Panel C, which shows that the average board size (*Board Size*) is about 8.5, which is comparable to the previous UK studies (e.g., Conyon and Peck, 1998; Vafeas and Theodorou, 1998). However, US firms seem to have greater board size (of 9) as reported by Combs et al. (2007). Similarly, Vepauskaite and Adams (2013) show that board size is about 9 in the UK. The fraction of non-executive directors on the board (*Board Composition*) is about 50%, which is identical to what Florackis and Ozkan (2009) reported for UK firms. In Vafeas and Theodorou (1998), one-third of UK board directors are independent.

⁴⁵ See www.northcote.co.uk.

Table 5.1. Definitions of variables and source of data

<i>Panel A: Dependent variables</i>	<i>Definitions</i>
Dividends/Assets	Ratio of total cash dividends on common stocks to book value of total assets
Dividends/MV	Ratio of total cash dividends on common stocks to market value of equity
Dividends/Sales	Total cash dividends on common stocks scaled by net sales
Dividends/EBITDA	Cash dividends on common stocks scaled by operating income before depreciation and amortization
Dividends/Earnings	Ratio of cash dividends on common stocks to net income minus preferred dividends
Dividends (Dummy)	Dummy variable: 1 if firm pays dividends and 0 otherwise
Repurchases/Assets	Ratio of the amount of share repurchases to the book value of total assets
Repurchases /MV	Ratio of the amount of share repurchases to the market value of equity
Repurchases /Earnings	Ratio of the amount of share repurchases to net income minus preferred dividends
Repurchases (Dummy)	Dummy variable: 1 if the firm repurchased its stocks in the relevant year, 0, otherwise
Payout/Assets	The amount of cash dividends on common stock plus the amount of share repurchases scaled by the book value of total assets
Payout/MV	The amount of cash dividends on common stock plus the amount of share repurchases scaled by market value of equity
Payout/Earnings	The amount of cash dividends on common stock plus the amount of share repurchases scaled by net income minus preferred dividends
Payout (Dummy)	Dummy variable: 1 if total payout (i.e., dividends plus repurchases) is non-negative; 0, otherwise
<i>Panel B: Firm-specific factors</i>	
Size (Assets)	Natural logarithm of total assets (in thousands) in 2000 prices
Size (Sales)	Natural logarithm of total sales (in thousands) in 2000 prices
Cash Flow	Ratio of pre-tax profit plus depreciation to book value of total assets
Cash Flow 2	Ratio of operating income before depreciation less capital expenditures to book value of total assets
Cash Holdings	Ratio of cash and cash equivalent to book value of total assets
Profitability	Ratio of earnings before interest and taxes to book value of total assets
ROA	Ratio of net income to book value of total assets
RE/TA	Ratio of retained earnings to book value of total assets
Undervaluation	Ratio of book value of equity to market value of equity
Leverage	Ratio of long-term debt plus long term debt in short term liability to the book value of assets
Leverage 2	Ratio of total debt to market value of equity
Market-to-Book	Ratio of market value of assets to book value of assets, where market value of assets is book value of assets plus market value of equity minus book value of equity
Current Growth	Change in total assets divided by total assets in the previous year
Future Growth	Ratio of market value of equity to book value of total assets
Capex	Ratio of capital expenditures to book value of total assets
Tangibility	Ratio of plant, property and equipment to book value of total assets
Dividend Premium	The difference between the natural logarithm of average market-to-book-ratio of dividend payers and non-dividend payers
Stock Return	Change in annual stock returns divided by stock returns in the previous year
Investment	Ratio of sum of capital expenditures and research and development expenses to book value of total assets
<i>Panel C: Corporate Governance</i>	
Board Size	Total number of board members (both insider and outsider)
Board Composition	Ratio of the number of independent members in the board to the total board members
Institutional 3%	The amount of all institutional holdings (greater than 3%) scaled by firms' total shares outstanding
Institutional 5%	The amount of all institutional holdings (greater than 5%) scaled by firms' total shares outstanding
Concentration 3%	The sum of stakes of all shareholders with ownership greater than 3%
Concentration 5%	The sum of stakes of all shareholders with ownership greater than 5%
Largest Three	The sum of stakes of the largest three shareholders scaled by the firm's total shares outstanding
<i>Panel D: CEO Characteristics</i>	
Overconfidence	Dummy variable: 1 if the CEO holds stock options, at least once during his tenure, until the expiry date or until the last year before the expiry date and the options held are at least 40% in the money entering its final year; 0, otherwise
Post-Holder	Dummy variable: 1 if the CEO, for the first time, held option package until expiration; 0, otherwise
Pre-Holder	Dummy variable: 1 if Overconfidence is 1 and Post-Holder is 0; 0, otherwise
Option Ownership	Ratio of the number of exercisable options owned by the CEO to the total shares outstanding
Stock Ownership	Ratio of the number of stocks owned by the CEO to the total shares outstanding
Age	Age of the CEO
CEO Tenure	Number of years that the CEO worked for the firm
CEO in Role	Number of years that the CEO served in their position
Founder	Dummy variable: 1 if the CEO is the founder of the company, 0, otherwise
Duality	Dummy variable: 1 if the CEO also serves as the board chair, 0, otherwise
British	Dummy variable: 1 if the CEO holds the British nationality, 0, otherwise

Notes: The source of data is i) Thomson DataStream for the variables in Panels A and B; ii) BoardEx and company annual reports for the variables 'Board Size, Board Composition, Option Ownership, Stock Ownership, Age, CEO Tenure, CEO in Role, Founder, Duality and British; iii) Thomson One for the variables in Panel C, except the first two factors; and iv) Self-constructed for the variables 'Overconfidence, Post-Holder, Pre-Holder'.

The recent increase in independent directors might be attributed to the recent corporate governance initiatives (Higgs, 2003), which recommends at least 50% of the board should be independent. In the US, board composition provides a different picture: Combs et al. (2007) find that US firms have about 43% of outside directors on their boards. These differences between the US and the UK might be attributed to different corporate governance codes. Institutional ownership (*Institutional 3%*) is about 83%, reflecting the fact that the major UK investors are institutional rather than small or individual (as in Veprauskaitė and Adams, 2013). Besides, the sum of stakes of all investors with greater than 3% (*Concentration 3%*) and 5% (*Concentration 5%*) equity ownership is about 27% and 20% respectively. Panel D, Table 5.2 reports the statistics for CEO characteristics. Over one-third of the CEOs in our sample are classified as overconfident (*Overconfidence*). This is similar to Croci et al.'s (2010) UK study of takeovers, but much higher than the findings of Andriosopoulos et al. (2013) and Deshmukh et al. (2013) for the UK and the US respectively. Andriosopoulos et al. (2013) report that 11% of the CEOs are overconfident based on a much smaller sample, and Deshmukh et al. (2013) focus on different markets and cover an earlier period (1984-1994). The mean proportion of exercisable options owned by CEOs (*Option Ownership*) is 0.2%, and the mean share ownership level by CEOs (*Stock Ownership*) is 2.4% with a maximum of 40%⁴⁶. The average CEO age (*Age*) is 52 and lies within the range of 38-67 years. The average CEO tenure (*CEO Tenure*) is about 14 years; the average CEO time in the role (*CEO in Role*) is about 8 years; 15% of the CEOs (*Founder*) are also the founders. Finally, 80% of CEOs in our sample are British citizens (*British*).

5.4.3 Pairwise correlations

Table 5.3 presents the pairwise correlations among the variables. Panel A shows that *Overconfidence* is negatively (positively) correlated with all the dividend and payout (repurchases) policy proxies. Moreover, *Overconfidence* is positively correlated with the firm-specific characteristics of *Size*, *Capex*, *Tangibility* and *Investment*. These results suggest that overconfident managers buy back more shares, pay less dividends (Deshmukh et al., 2013) and invest more (e.g., Malmendier and Tate, 2005a). Panel B reveals that overconfidence is positively correlated with the board size and negatively correlated with the rest of corporate governance variables; and Panel C shows that all CEO traits are significantly associated with overconfidence, which contrasts with Malmendier and Tate's (2005a) study based on US firms. This difference prompts us to re-examine the relationship between overconfidence and dividend policy in the UK.

⁴⁶ The large number of CEO stock ownership might due to some of the CEOs being the founders of firms they manage. For example, R.S Kelvin in Ted Baker plc.; Charles Wigoder in Telecom Plus plc.; and Zvi Marom in Batm Advanced plc. are both the CEOs and the founders.

Table 5.2. Descriptive statistics

Panel A.	Mean	Median	SD	Min	Max	Panel B.	Mean	Median	SD	Min	Max
Dividends/Assets	0.03	0.02	0.03		0.00 0.20	Size (Assets)	13.24	13.06	1.70	10.09	18.41
Dividends/MV	0.03	0.03	0.28		0.00 0.17	Size (Sales)	13.10	13.00	1.76	9.04	18.61
Dividends/Sales	0.03	0.03	0.04		0.00 0.30	Cash Flow	0.13	0.12	0.09	-0.13	0.44
Dividends/EBITDA	0.20	0.17	0.16		0.00 0.97	Cash Flow 2	0.09	0.09	0.08	-0.19	0.39
Dividends/Earnings	0.35	0.34	0.23		0.00 0.99	Cash Holdings	0.11	0.08	0.11	0.00	0.56
Dividends (Dummy)	0.89	1.00	0.31		0.00 1.00	Profitability	0.14	0.13	0.08	-0.07	0.45
Repurchases/Assets	0.01	0.00	0.03		0.00 0.22	ROA	0.07	0.06	0.07	-0.20	0.32
Repurchases /MV	0.01	0.00	0.02		0.00 0.14	RE/TA	0.20	0.24	0.33	-1.53	0.99
Repurchases /Earnings	0.06	0.00	0.18		0.00 2.85	Undervaluation	0.70	0.89	0.87	0.11	4.32
Repurchases (Dummy)	0.33	0.00	0.47		0.00 1.00	Leverage	0.29	0.14	0.40	0.00	1.00
Payout/Assets	0.04	0.02	0.05		0.00 0.30	Leverage 2	0.86	0.59	0.86	0.02	4.74
Payout/MV	0.04	0.03	0.04		0.00 0.25	Market-to-Book	1.89	1.47	1.35	0.66	9.58
Payout/Earnings	0.30	0.25	0.24		0.00 2.63	Current Growth	0.15	0.08	0.30	-0.27	1.70
Payout (Dummy)	0.90	1.00	0.29		0.00 1.00	Future Growth	1.33	0.89	1.41	0.16	9.56
						Capex	0.05	0.04	0.05	0.00	0.25
Panel C.	Mean	Median	SD	Min	Max	Tangibility	0.30	0.25	0.25	0.01	0.92
Board Size	8.5	8.0	2.7		4.0 19.0	Dividend Premium	-0.14	-0.01	0.44	-2.23	0.14
Board Composition	0.5	0.5	0.1		0.1 0.8	Stock Return	0.16	0.10	0.48	-0.72	1.98
Institutional 3%	0.2	0.2	0.2		0.0 0.8	Investment	0.07	0.05	0.08	0.00	0.49
Institutional 5%	0.2	0.1	0.2		0.0 0.7						
Concentration 3%	0.3	0.3	0.2		0.0 0.8	Panel E.	Overconfidence across years				
Concentration 5%	0.2	0.2	0.2		0.0 0.8	Year	OC	NOC	Total		
Largest Three	0.2	0.2	0.2		0.0 0.7	2000	10	14	24		
						2001	18	26	44		
						2002	24	38	62		
Panel D.	Mean	Median	SD	Min	Max	2003	26	48	74		
Overconfidence	0.35	0.00	0.48		0.00 1.00	2004	26	49	75		
Post-Holder	0.16	0.00	0.37		0.00 1.00	2005	30	54	84		
Pre-Holder	0.18	0.00	0.38		0.00 1.00	2006	30	57	87		
Option Ownership	0.00	0.00	0.01		0.00 0.03	2007	30	60	90		
Stock Ownership	0.02	0.00	0.07		0.00 0.40	2008	30	61	91		
Age	51.82	52.00	6.57		38.00 67.00	2009	31	57	88		
CEO Tenure	14.23	12.80	8.64		0.60 36.90	2010	31	58	89		
CEO in Role	7.90	6.70	5.85		0.20 25.90	2011	27	61	88		
Founder	0.15	0.00	0.36		0.00 1.00	2012	24	52	76		
Duality	0.22	0.00	0.42		0.00 1.00	Total	337	635	972		
British	0.80	1.00	0.40		0.00 1.00						
Panel F.											
	Year	Div	TA	Payout%	No. of firms pay Div	No. of firm not paying Div	Total				
	2000	4.4	112.3	3.9	22	2	24				
	2001	5.3	152.1	3.5	39	5	44				
	2002	6.7	165.3	4.1	54	8	62				
	2003	7.0	203.4	3.4	64	10	74				
	2004	8.1	214.6	3.8	67	8	75				
	2005	8.6	225.4	3.8	77	7	84				
	2006	9.7	266.3	3.6	78	9	87				
	2007	10.1	271.7	3.7	80	10	90				
	2008	12.4	394.4	3.2	82	9	91				
	2009	14.2	415.4	3.4	75	13	88				
	2010	9.8	433.0	2.3	73	16	89				
	2011	10.9	446.0	2.4	78	10	88				
	2012	11.7	450.5	2.6	69	7	76				

Notes: N is 972 for all variables in panels A to F; the panel titles are as in Table 5.1. In Panel E, OC (NOC) means overconfidence (non-overconfidence); overconfidence indicates that the manager holds in the money vested options (at least 40% in the money) at least once during his tenure as a CEO to the last year before the expiry date and non-overconfidence represents a manager who is not classified as overconfident. In Panel D, the median values for some variables are (very close to) 0 or 1 as they are binary dummy variables. Our descriptive statistics regarding Option Ownership and Stock Ownership are very similar to those reported by Malmendier and Tate (2005a, 2011), noting that they multiply the figures of the former by 10 to compare the mean of both factors. See Table 5.1 for the definitions of variables. Panel F reports the amount of dividend (Div), Total assets (TA), payout (Div/TA) in percentage and number of firms that pay and don't pay dividend (Div and TA are in millions).

5.5 Methodology

5.5.1 The Regression Model

The earlier studies have shown that managerial overconfidence, firm-specific factors, corporate governance and CEO characteristics can significantly explain corporate payout policies. We examine the effect of these factors on payout policy using the following model:

$$Payout_{i,t} = \beta_1 + \beta_2 Overconfidence_{i,t-1} + \Sigma \beta X_{i,t-1} + \Sigma \omega \phi_{i,t-1} + \Sigma \psi Z_{i,t-1} + \varepsilon_{it} \quad (5.1)$$

where *Payout* is the proxy for dividends, share buybacks or total payout policy for firm *i* at time *t*; *Overconfidence* is a dummy variable that is 1 if the CEO is classified as overconfident; 0, otherwise; *X*, *φ*, and *Z* are sets of firm-specific, corporate governance, and CEO characteristics, respectively; *β*'s, *ω* and *ψ* are estimable parameters and *ε* is the error term. All explanatory variables are lagged by one year to partially account for the potential endogeneity problem. Year and industry dummies are included in all models. The definitions of variables are presented in Table 5.1. Equation (5.1) is used as the basis to consider different combinations of the explanatory variables.

5.5.2 Estimation Methods

Previous studies that have investigated the determinants of dividend policy have employed various estimation methods (e.g., GLS, LSDV, Fixed effects and Tobit). The estimation methods such as generalised least square with respect to the random effects model (GLS) and the least squares with dummy variables model (LSDV) exclude firms that do not pay dividends from the sample. In this context, Kim and Maddala (1992) argue that eliminating firms with zero dividend observations causes selection biases, particularly, when there are many firms in the sample exhibiting this phenomena. Similarly, Deshmukh (2003) states that ignoring non-dividend-paying firms from the empirical analysis leads to inconsistent estimates of the underlying parameters. Furthermore, dropping firms that do not pay dividends will reduce the number of observations in the regression by almost 11%.⁴⁷

Additionally, fixed effects regressions using panel data can be employed to explain the variation about the mean of the dependent variable (i.e., dividends) in terms of the variations about the mean of the predictors' variables for the group of observations relating to a given firm. This approach tackles unobserved heterogeneity bias. However, the feature of our main independent variable: overconfidence which is a dummy variable, does not vary much within a firm. Therefore, identifying the effect of overconfidence on dividend policy from time-series variation within the firm is not feasible in this study.

⁴⁷ In this study sample, we have identified that around 11% of firms do not pay dividends.

The Tobit estimation method has been used in this study with a left-censoring limit at zero for two main reasons. Firstly, in paying dividends, firms have two options either to pay or not. Hence, the observed dependent variable, i.e. *the dividends*, exhibits special features as it takes values which are positive or zero and not negative (a censored dependent variable). Second, this estimation method does not exclude non-paying dividend firms in the sample which eliminates the selection biases and increases the sample size for this study.⁴⁸ This method has been extensively used in recent studies of the determinants of dividend policy (e.g., De Cesari, 2012; De Cesari and Ozkan, 2015; Deshmukh et al., 2013). The model would be

$$\begin{aligned} Payout^*_{i,t} &= \beta_1 + \beta_2 Overconfidence_{i,t-1} + \Sigma \beta X_{i,t-1} + \Sigma \omega \phi_{i,t-1} + \Sigma \psi Z_{i,t-1} + \varepsilon_{it} \quad (5.2) \\ Payout_{i,t} &= Payout^*_{i,t} \quad \text{for } Payout^*_{i,t} > 0 \\ Payout_{i,t} &= 0 \quad \text{for } Payout^*_{i,t} \leq 0 \end{aligned}$$

It is worth noting that the estimated coefficients from equation (5.2) measure the partial effects of the independent variables on $E(Payout^*|independent\ variables)$, where $Payout^*$ is the latent variable. However, this study aims to explain the observed outcome, i.e. $Payout$: $E(Payout|Payout > 0, independent\ variables)$. This tells us, for given values of the independent variables, the expected value of $Payout$ for the subsample where $Payout$ is positive. Hence, the marginal effects at the mean (MEMs) are also computed for the observed $Payout$ (Wooldridge, 2006, p595-604).

This study also investigates the impact of managerial overconfidence on the propensity to pay dividends. Earlier studies use either *logit* or *probit* estimation methods to assess the impact of various variables on the probability of paying dividends. For instance, the impact of cash-flow uncertainty (Chay and Suh, 2009); the life cycle theory (Brockman and Unlu, 2011); and corporate governance (Jiraporn et al., 2011) on the likelihood of paying dividends are examined using one of these estimation methods. This study follows the same approach to assess the influence of managerial overconfidence on the likelihood of paying dividends by employing probit estimation methods with panel data. The dependent variable is Dividend payment (dummy) which takes the value of 1 if the firm pays a dividend and 0 otherwise. Similar to the Tobit model, the marginal effects at the means are also estimated. It measures the change in the probability of $Payout$ for a change in the independent variable, holding all other variables at their mean values.

5.5.3 Collinearity and Model Specifications

A strong relationship between independent variables in the regression creates collinearity which can lead to a reduction in the stability of the estimated parameters, inflating the standard errors and lowering

⁴⁸ This argument can also be applied to repurchases and total payout.

the power to measure the effect. This study primarily uses the correlation matrix to detect this problem and, hence, will not be including two highly correlated variables in the same model. In this section, a more advanced collinearity diagnostic is calculated based on the variance inflation factor (VIF).

The VIF examines how the collinearity affects the variance of the estimated coefficients. The collinearity can be a problem when the VIF is greater than 10 (Belsley et al., 2005). The VIF is computed for all estimated models in order to check if collinearity is a major concern in the sample. In all the models the highest value of the VIF is 2.31 and the average VIF is 1.44. These findings indicate that collinearity is not a major problem in this study.

Furthermore, in all Tobit models, the likelihood-ratio tests are performed to compare the Tobit model using a panel with the Tobit model using pooled data. The results in all models strongly favour the random effects Tobit model.⁴⁹ However, an option to cluster standard errors is not available when using the Tobit random effects model. Nevertheless, the estimated results of the Tobit random effects model are not expected to be affected by the clustering for two reasons. Firstly, the number of firms (103) exceeds the number of years (12) in the study sample. Secondly, all the reported results control for year and industry fixed effects. For a robustness check, all regressions are carried out using Tobit models on pooled data with clustering of the standard errors at the firm level.

⁴⁹ It is worth mentioning that estimation of conditional fixed effects for Tobit models is not possible because sufficient data allowing the fixed effect to be conditioned out of the likelihood does not exist (Becher et al., 2005).

Table 5.3. Correlation matrix

Panel A.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
(1) Overconfidence																											
(2) Dividends/Assets	-0.20																										
(3) Dividends/MV	-0.17	0.44																									
(4) Dividends/Sales	-0.01	0.57	0.33																								
(5) Dividends/Earnings	-0.13	0.66	0.60	0.58																							
(6) Dividends/EBITDA	-0.10	0.20	0.23	0.16	0.26																						
(7) Repurchases/Assets	0.03	0.34	-0.02	0.21	0.08	-0.01																					
(8) Repurchases /MV	0.09	0.15	0.09	0.11	0.04	-0.01	0.80																				
(9) Repurchases /Earnings	0.06	0.16	-0.01	0.14	0.04	-0.01	0.86	0.82																			
(10) Repurchases (Dummy)	0.10	0.17	0.07	0.11	0.10	0.03	0.43	0.49	0.47																		
(11) Payout/Assets	-0.10	0.81	0.29	0.48	0.49	0.14	0.79	0.59	0.61	0.37																	
(12) Payout/MV	-0.06	0.40	0.77	0.30	0.44	0.16	0.48	0.68	0.43	0.33	0.57																
(13) Payout/Earnings	-0.11	0.47	0.51	0.26	0.59	0.55	0.39	0.37	0.44	0.29	0.55	0.59															
(14) Payout (Dummy)	-0.01	0.30	0.37	0.26	0.41	0.15	0.10	0.11	0.11	0.23	0.26	0.32	0.42														
(15) Size (Assets)	0.08	-0.08	0.12	0.08	0.08	0.02	0.15	0.21	0.22	0.30	0.07	0.19	0.21	0.22													
(16) Cash Flow	-0.02	0.56	0.04	0.25	0.19	0.03	0.30	0.15	0.16	0.17	0.52	0.12	0.17	0.26	-0.14												
(17) Profitability	-0.05	0.58	0.05	0.19	0.13	0.03	0.29	0.13	0.15	0.17	0.51	0.11	0.17	0.22	-0.12	0.87											
(18) ROA	0.01	0.53	0.04	0.31	0.22	0.00	0.29	0.14	0.15	0.16	0.48	0.11	0.14	0.25	-0.09	0.91	0.76										
(19) RE/TA	0.05	0.18	0.10	0.19	0.10	0.05	0.09	0.04	0.08	0.12	0.16	0.10	0.12	0.32	0.14	0.31	0.29	0.32									
(20) Undervaluation	-0.02	-0.34	0.18	-0.20	-0.14	0.02	-0.18	-0.08	-0.14	-0.12	-0.32	0.09	-0.07	-0.06	0.08	-0.50	-0.42	-0.45	-0.07								
(21) Leverage	0.02	-0.23	0.13	-0.09	-0.15	0.03	-0.11	-0.02	-0.08	-0.08	-0.21	0.09	-0.07	-0.03	0.19	-0.36	-0.26	-0.33	-0.13	0.70							
(22) Current Growth	-0.03	0.40	-0.18	0.14	0.02	-0.05	0.27	0.07	0.12	0.04	0.37	-0.08	-0.03	-0.14	-0.23	0.49	0.49	0.47	-0.12	-0.53	-0.33						
(23) Capex	0.11	0.02	-0.07	-0.07	-0.11	0.01	0.03	0.04	-0.01	0.06	0.03	-0.02	-0.02	-0.02	0.02	0.28	0.22	0.14	0.11	-0.16	-0.05	0.12					
(24) Tangibility	0.14	-0.07	0.04	-0.04	-0.11	0.01	0.03	0.15	0.08	0.16	-0.01	0.11	0.03	0.11	0.25	0.06	0.06	-0.04	0.11	0.08	0.31	-0.15	0.59				
(25) Future Growth	-0.01	0.38	-0.22	0.16	0.01	-0.06	0.27	0.07	0.12	0.04	0.36	-0.10	-0.05	-0.17	-0.26	0.50	0.48	0.48	-0.06	-0.56	-0.38	0.98	0.13	-0.16			
(26) Dividend Premium	-0.04	0.00	0.02	0.04	0.04	0.04	-0.01	-0.04	-0.02	0.04	-0.01	-0.01	0.05	-0.01	0.07	-0.13	-0.11	-0.09	0.04	0.15	0.10	-0.20	-0.14	-0.08	-0.19		
(27) Stock Return	0.04	-0.02	-0.23	0.02	-0.10	-0.06	0.04	-0.01	0.02	0.00	0.00	-0.17	-0.12	-0.01	-0.13	0.14	0.09	0.15	-0.03	-0.33	-0.22	0.32	-0.02	-0.03	0.33	-0.11	
(28) Investment	0.07	-0.04	-0.21	-0.09	-0.19	-0.04	0.05	0.03	0.03	-0.01	0.01	-0.13	-0.14	-0.30	-0.16	0.17	0.11	0.04	-0.21	-0.30	-0.19	0.45	0.61	0.22	0.48	-0.12	0.06
Panel B.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Panel C.		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)										
(1) Overconfidence								(1) Overconfidence																			
(2) Board Size	0.16							(2) Option Ownership	0.14																		
(3) Board Composition	-0.18	-0.09						(3) Stock Ownership	-0.02	0.02																	
(4) Institutional 3%	-0.05	-0.10	-0.04					(4) Age	0.08	0.07	-0.05																
(5) Institutional 5%	-0.07	-0.08	-0.09	0.94				(5) CEO Tenure	0.08	-0.11	-0.01	0.23															
(6) Concentration 3%	-0.07	-0.21	-0.10	0.81	0.78			(6) CEO in Role	0.03	0.03	0.13	0.37	0.53														
(7) Concentration 5%	-0.09	-0.19	-0.14	0.72	0.79	0.95		(7) Founder	0.12	0.19	0.56	-0.03	0.16	0.30													
(8) Largest Three	-0.10	-0.17	-0.17	0.64	0.68	0.91	0.94	(8) Duality	0.20	0.03	0.04	0.09	0.06	-0.02	0.00												
								(9) British	0.13	-0.14	-0.01	-0.08	0.15	-0.02	-0.04	0.03											

Notes: This table reports the pairwise correlations among the variables for the firm-specific factors (Panel A), corporate governance factors (Panel B) and CEO characteristics (Panel C). The figures in **bold** indicate that the coefficient is significant at the 1% significance level. The highest (average) value of the variance inflation factor (VIF) is 2.31 (1.44), which indicates the absence of multicollinearity problem.

5.6 Empirical results

5.6.1 Overconfidence and dividend levels

Table 5.4 investigates the impact of overconfidence, firm characteristics, corporate governance and CEO traits on dividend payments relative to total assets. In all models *Overconfidence* coefficients are negative and statistically significant, indicating that firms with overconfident managers pay less dividends compared to their rational peers. This key finding is robust to whether the model excludes or includes explanatory variables other than *Overconfidence*. This confirms that the effect of managerial overconfidence on dividend policy is not exclusive to US firms (Deshmukh et al., 2013) and should be recognized as an important determinant in the UK as well.

The results in models 2 to 5 in Table 5.4 show that *Cash Flow*, *Size* and *ROA* have positive and significant coefficients, indicating that large and profitable firms and those with high cash flows pay more dividends compared to their counterparts, which are in line with Fama and French (2001) and Deshmukh et al. (2013). On the other hand, *Leverage*, *Current Growth* and *Investment* are significant and negatively related to dividends, implying that firms with high leverage, more growth opportunities and more investments pay less dividends, which confirms other results such as, Jiraporn et al. (2011).

Furthermore, *Tangibility* and *Dividend Premium*⁵⁰ are insignificantly related to dividends. These findings imply that the level of asymmetric information is not related to dividends, which is inconsistent with both the signalling hypothesis and Deshmukh et al.'s (2013) findings. The dividend premium results are in line with Denis and Osobov (2008) in the UK, and Baker and Wurgler (2004) in the US, and Li and Lie (2006). Moreover, the estimates regarding *Undervaluation* are negative and highly significant, indicating that (potentially) undervalued firms pay less dividends. One possible interpretation of this finding is that managers in such firms may view their company as undervalued and prefer to distribute cash to shareholders through alternative payout channels (e.g., share repurchases). This would suggest that dividends are not used to convey to the market that a firm's stock is undervalued and hence could not be used as a signal for undervaluation. This, to some extent, supports previous work

⁵⁰ In a separate set of regressions in this table and the others, we excluded *Dividend Premium* as it may be an endogenous factor. However, our analyses show that we do not suffer from this issue as the results are qualitatively the same.

which shows that firms use share buybacks rather than dividends as a signal for undervaluation (e.g., Dann, 1981; Wansley et al., 1989; Ikenberry et al., 1995).

Table 5.4. Overconfidence and dividend levels

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Overconfidence	-0.007*	-0.009**	-0.009***	-0.008*	-0.009***	-0.007*	-0.007*	-0.009**	-0.012***	-0.011***	
	(-1.71)	(-2.33)	(-2.46)	(-1.92)	(-2.35)	(-1.74)	(-1.72)	(-2.11)	(-2.82)	(-2.78)	
Pre-Holder											-0.012***
											(-2.72)
Post-Holder											-0.011**
											(-2.52)
Cash Flow		0.117***	0.108***								
		(9.39)	(8.58)								
Leverage		-0.006**			-0.006**						
		(-2.24)			(-2.37)						
Size (Assets)		0.004***	0.004***	0.003**	0.003**				0.003**	0.003**	0.003**
		(3.00)	(3.00)	(2.11)	(2.52)				(1.99)	(2.03)	(2.03)
Current Growth		-0.005**	-0.005**	-0.006**	-0.006**				-0.005**	-0.005**	-0.005**
		(-1.99)	(-2.29)	(-2.46)	(-2.39)				(-2.38)	(-2.37)	(-2.37)
Tangibility		-0.009	-0.010	-0.0005	-0.004				-0.006	-0.006	-0.006
		(-1.29)	(-1.42)	(-0.06)	(-0.60)				(-0.75)	(-0.87)	(-0.87)
Stock Return		-0.001	-0.002	-0.002	-0.001				-0.002	-0.002	-0.002
		(-0.72)	(-1.53)	(-1.23)	(-0.74)				(-1.50)	(-1.51)	(-1.51)
Dividend Premium		-0.0004	-0.0001	-0.001	-0.001				-0.0007	-0.0006	-0.0006
		(-0.20)	(-0.05)	(-0.66)	(-0.48)				(-0.34)	(-0.25)	(-0.28)
Undervaluation			-0.004***	-0.006***					-0.004***	-0.004***	-0.004***
			(-4.17)	(-6.37)					(-4.66)	(-4.64)	(-4.64)
Investment				-0.047**							
				(-2.35)							
ROA					0.122***				0.116***	0.117***	0.116***
					(8.22)				(7.63)	(7.65)	(7.62)
Board Size						0.001*	0.001**		0.001*	0.001**	0.001**
						(1.93)	(2.00)		(1.95)	(2.03)	(2.02)
Board Composition						0.005	0.005		0.004	0.005	0.005
						(0.57)	(0.59)		(0.53)	(0.57)	(0.57)
Institutional 3%						0.010			0.019***		
						(1.44)			(2.76)		
Concentration 3%							0.0001			0.0002***	0.0002***
							(1.50)			(2.89)	(2.89)
Option Ownership								-0.264	-0.214	-0.221	-0.214
								(-1.49)	(-1.25)	(-1.29)	(-1.24)
Stock Ownership								-0.044	-0.010	-0.018	-0.018
								(-1.05)	(-0.25)	(-0.46)	(-0.47)
Duality								0.0002	-0.002	-0.002	-0.002
								(0.05)	(-0.63)	(-0.63)	(-0.63)
Age								0.0007***	0.0005**	0.0005**	0.0005*
								(2.60)	(1.96)	(1.96)	(1.88)
CEO Tenure								0.00002	-0.0002	-0.0002	-0.0002
								(0.09)	(-0.77)	(-0.83)	(-0.84)
CEO in Role								-0.0007***	-0.0006**	-0.0006**	-0.0006**
								(-2.66)	(-2.42)	(-2.38)	(-2.36)
Founder								0.007	0.004	0.003	0.003
								(0.80)	(0.52)	(0.43)	(0.43)
British								0.005	0.007	0.007*	0.007*
								(1.09)	(1.62)	(1.67)	(1.67)
Constant	0.026***	-0.036*	-0.030	-0.002	-0.023	0.013	0.012	-0.005	-0.051**	-0.052**	-0.052**
	(4.86)	(-1.95)	(-1.62)	(-0.07)	(-1.22)	(1.53)	(1.39)	(-0.37)	(-2.15)	(-2.21)	(-2.17)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
χ^2	20.23	134.8***	148.6***	74.48***	112.6***	26.13*	26.30*	35.63**	154.3***	155.0***	155.2***
Log likelihood	2021.2	2075.8	2082.0	2047.9	2066.3	2024.1	2024.2	2028.9	2085.4	2085.8	2085.8
Firms	103	103	103	103	103	103	103	103	103	103	103
Observations	972	972	972	972	972	972	972	972	972	972	972

Notes: This table reports outputs from a random-effects Tobit model on panel data. The dependent variable is *Dividends/Assets*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. *z* values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Model 6 in Table 5.4 shows that *Board Size* has a positive and significant coefficient. This result may suggest that firms with more directors on the board force managers to pay more dividends to mitigate the agency costs of free cash flow (Jensen and Meckling, 1976). The coefficient on *Institutional 3%* is insignificant indicating that institutional holdings do not exert any significant influence over dividends (as in Grinstein and Michaely, 2005). In model 7,

Institutional 3% is replaced by *Concentration 3%*⁵¹, ownership concentration not related to dividends. Model 8 shows that the coefficient of *Age* is positive and significant, which implies that as a CEO becomes older, they pay more dividends. It may be that older CEOs prefer not to accumulate cash for future investments such as for mergers and acquisitions (Yim, 2013). Hence, they may prefer to pay more dividends in order to boost the market price. Model 8 also shows that *CEO in Role* is negatively related with dividends. This might occur because, as a CEO's tenure increases, so does his power over the board, and hence he forces a reduction in dividends to fund new projects internally.

In the more comprehensive models 9 and 10 of Table 5.4, the negative coefficient on *Overconfidence* increases in magnitude, being significant at the 1% level. *Institutional 3%* has a positive and highly significant coefficient at the 1% level, indicating that institutional holdings are closely associated with dividends. This is consistent with Short et al. (2002) who report that dividend policy is positively correlated with institutional holdings in the UK, which is in contrast to Grinstein and Michaely (2005) in the US. *Concentration 3%* also has a positive coefficient that is significant at the 1% level, indicating that firms with higher concentrated ownership pay more dividends. This result is in line with Holder et al. (1998) but inconsistent with Oswald and Young (2008) where they find that firms with large outside shareholders do not use dividends as a monitoring device. Furthermore, the coefficient estimates on *British* becomes significantly positive, showing that British CEOs pay higher dividends than their peers. All other variables retain their signs and significance levels.

In model 11 of Table 5.4, *Pre-Holder* and *Post-Holder* replace *Overconfidence* to allow for time variation in the sample and eliminate forward looking behaviour in the CEO classifications. The findings reveal that the coefficients for both factors are significantly negative, suggesting the impact of managerial overconfidence on dividends is persistent and does not vary overtime once the CEOs become overconfident. This finding is in line with Malmendier and Tate (2008), and Deshmukh et al. (2013) for US firms. All other results remain qualitatively the same, indicating the robustness of the impact of managerial overconfidence on dividend policy.⁵²

⁵¹ We avoided including both factors in the same model due to the multicollinearity issue.

⁵² For robustness, the analyses of models 2 to 9 of Table 5.4 are repeated by including *Pre-Holder* and *Post-Holder* instead of overconfidence measure. The results do not change and hence for brevity, only model 11 is reported.

In addition to statistical significance, the results in Table 5.4 are economically significant. Focusing on models' 9 and 10 results (Appendix L Table A.5.4), for example, fixing all other variables at their mean values, firms with overconfident CEOs predicted decreases in dividends (measured as dividends to total assets) by approximately 0.9% (in models 9 and 10), which is quite significant given the sample mean of 3%. Overall, the results in Table 5.4 confirm the fact that firms managed by overconfident managers tend to pay out less cash dividends.

5.6.2 Overconfidence and the propensity to pay dividends

In Table 5.5, the estimated coefficient of *Overconfidence* in all models is negative and significant, indicating that firms run by overconfident managers exhibit a higher probability of not paying dividends, which confirms our main hypothesis. Models 1 to 4 reveal that the coefficients pertaining to the variables cash flow, firm size and profitability are positive and significant at the 1% level.⁵³ This implies that any increase in these variables heightens the likelihood of paying dividends. The coefficient on *Leverage* is significantly negative, which may suggest that debt ratios can be used to mitigate agency conflicts via the restrictions imposed by debt holders about dividend payments. These results are in line with e.g., Fama and French (2001), Chay and Suh (2009) and Jiraporn et al. (2011). Furthermore, the *Undervaluation* coefficient is significantly negative, which implies that the potential undervaluation of stocks reduces the propensity of firms to pay dividends. Moreover, the coefficient on *Tangibility* is positive and significant, suggesting that firms with lower asymmetric information (i.e., with higher tangible assets) are more likely to pay dividends, which is in line with Myers and Majluf (1984) and Deshmukh et al. (2013).

The corporate governance variables and CEO characteristics are considered in models 5 and 6 of Table 5.5. The results show that *Age*, *CEO Tenure* and *British* have significant and positive effects on the propensity to pay dividends. These findings indicate that CEO characteristics not only influence the amount of dividends paid (as reported in Table 5.4), but also the propensity to pay dividends (consistent with Hu and Kumar, 2004; Jiraporn et al., 2011). However, the coefficients on the corporate governance variables turn out to be statistically insignificant in models 5 and 6 compared with the results reported in Table 5.4. These findings imply that the corporate governance mechanism does not affect the propensity to pay dividends in the UK.

⁵³ We avoided including all firm-specific factors in the same model due to the multicollinearity problem.

Table 5.5. Overconfidence and the propensity to pay dividends

	(1)	(2)	(3)	(4)	(5)	(6)
Overconfidence	-1.119*	-1.057*	-1.293*	-1.233*	-2.822**	-2.812**
	(-1.70)	(-1.82)	(-1.80)	(-1.81)	(-1.98)	(-2.15)
Cash Flow	14.06***		13.44***			
	(6.06)		(5.83)			
Leverage	-1.820***			-1.991***		
	(-3.01)			(-3.21)		
Size (Assets)	2.899***	2.724***	3.394***	3.348***	2.781***	2.791***
	(5.51)	(7.87)	(8.07)	(7.48)	(5.41)	(5.47)
Current Growth	-0.392	-0.130	-0.686	-0.789	-0.639	-0.645
	(-0.73)	(-0.26)	(-1.14)	(-1.43)	(-0.95)	(-0.96)
Tangibility	2.853*	3.045**	3.952***	4.313***	5.819***	5.707**
	(1.78)	(2.54)	(2.80)	(2.93)	(2.66)	(2.25)
Stock Return	0.240	-0.114	0.0255	0.227	0.364	0.363
	(0.80)	(-0.41)	(0.08)	(0.77)	(0.88)	(0.85)
Dividend Premium	-0.538	-0.763	-0.874	-0.851	-1.483	-1.471
	(-0.71)	(-0.93)	(-0.77)	(-1.14)	(-1.05)	(-1.06)
Profitability		10.86***				
		(4.47)				
Undervaluation		-0.733***	-0.697***		-0.621**	-0.617**
		(-4.59)	(-3.56)		(-2.52)	(-2.49)
ROA				16.87***	16.34***	16.35***
				(6.09)	(4.91)	(4.96)
Board Size					0.0974	0.102
					(0.50)	(0.50)
Board Composition					-4.918	-5.118
					(-1.59)	(-1.38)
Institutional 3%					2.356	
					(1.00)	
Concentration 3%						0.0207
						(0.82)
Option Ownership					12.49	13.94
					(0.19)	(0.19)
Stock Ownership					6.744	4.606
					(0.87)	(0.59)
Duality					-0.747	-0.794
					(-0.78)	(-0.84)
Age					0.208**	0.210**
					(2.42)	(2.52)
CEO Tenure					0.271**	0.269**
					(2.38)	(2.28)
CEO in Role					-0.114	-0.112
					(-1.20)	(-1.18)
Founder					-3.296*	-3.297
					(-1.66)	(-1.61)
British					5.015***	5.233***
					(3.51)	(3.48)
Constant	-30.00***	-27.38***	-35.07***	-34.18***	-42.99***	-43.33***
	(-4.75)	(-6.30)	(-6.57)	(-6.27)	(-5.43)	(-5.87)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
χ^2	47.96***	86.50***	93.11***	70.31***	128.5***	131.8***
Log likelihood	-118.4	-128.1	-116.3	-116.9	-102.4	-102.4
Firms	94	94	94	94	94	94
Observations	888	888	888	888	888	888

Notes: This table reports outputs from a Probit model on panel data. The dependent variable is *Dividends (Dummy)*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. z values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively

This finding is inconsistent with Jiraporn et al. (2011) who find a positive association between corporate governance and the likelihood of paying dividends in the US but are in line with Mancinelli and Ozkan (2006) for Italy.

These results show that the probability of firms paying dividends is affected by the type of CEO (overconfident vs. non-overconfidence). The estimated marginal effects reveal that in Models 5 and 6 (Appendix L Table A.5.5), for example, amongst firms that paying dividends the predicted probability of paying dividends is lower in firms run by overconfident managers by about 4%, holding all other independent variables at their mean values.

5.6.3 The relevance of interaction effects for dividends

In Table 5.6, we examine some key factors which have been interacted with managerial overconfidence and then check their relevance to dividends through estimating the marginal effects (Appendix L Table A.5.6). Model 1 of Table 5.6 shows that the coefficient of *Cash Flow* is positive but *Overconfidence*Cash Flow* generates a negative coefficient, both statistically significant. In terms of the marginal effects, the results are economically significant as stated in Model 1 of Table A.5.6 in Appendix L.

These findings imply that higher cash flows lead to higher dividend payments but the magnitude of this direct link reduces in firms with overconfident managers (from 0.12 to 0.07). In other words, overconfident managers pay less cash dividends than their rational peers, implying that they prefer to accumulate more cash to avoid relying on external finance for future investments (Malmendier and Tate, 2005a; Hackbarth, 2008). This finding contrasts with Deshmukh et al., (2013) who find that the relationship between cash flow and dividends is stronger for overconfident managers.

Model 2 of Table 5.6 shows that the coefficient of *ROA* is positive but *Overconfidence*ROA* has a negative coefficient, both statistically significant. In economic terms as reported in Model 2 (Appendix L Table A.5.6), the results suggest that although higher profitability leads to higher dividend payments, for overconfident managers the magnitude of this positive association is reduced from 0.12 to 0.05. An explanation for this result might be that overconfident managers prefer to retain cash for future investment and perceive external finance as costly and, thus, pay lower dividends than rational counterparts.

In model 3 (Table 5.6), the negative and significant coefficient on *Current Growth* suggests that firms with higher growth pay less dividends. The coefficient of *Overconfidence*Current*

Growth is negative, which implies that the negative correlation between dividends and growth becomes more apparent for firms run by overconfident managers.

However, this increase in negativity by 0.002 is statistically insignificant as reported in model 3 (Appendix L Table A.5.6). Nevertheless, this finding contradicts Deshmukh et al. (2013) who demonstrated that the influence of managerial overconfidence on dividends is mitigated in high growth firms, as we have found an increasing effect for the UK counterparts.

Model 4 of Table 5.6 reveals that the *Undervaluation* coefficient is significantly negative but the significant coefficient estimate on *Overconfidence*Undervaluation* has the opposite sign. The marginal effects in model 4 (Appendix L Table A.5.6) reveal similar results, implying that higher undervaluation of shares causes lower dividend payments but this negative link is mitigated from -0.005 to -0.001 for firms with overconfident managers. This indicates that overconfident managers in undervalued firms reduce dividends less compared to rational managers. Therefore, this finding seems to go against the theory that overconfident managers always believe that their stocks are undervalued and hence reduce dividends further (e.g., Malmendier and Tate, 2005a; Hackbarth, 2008).

Model 5 of Table 5.6 shows that the coefficient of *Board Size* is significantly positive, and the coefficient estimate on *Overconfidence*Board Size* is negative. Economically, these findings suggest that larger boards pay more dividends, but this positivity is reduced (albeit insignificantly) with overconfident managers as revealed in model 5 of Appendix L Table A.5.6.

In model 6 (Table 5.6), both coefficients for *Concentration 3%* and *Overconfidence*Concentration 3%* are significantly positive. In addition to statistical significance, the results are economically significant as reported in model 6 (Appendix L Table A.5.6). The results indicate that higher ownership concentration is associated with more dividend payments, and this positive effect gets larger with overconfident managers. One possible explanation for this heightened positivity is that, in the presence of larger shareholders, overconfident CEOs might face a threat of dismissal from those shareholders especially when their power is high. This in turn motivates overconfident CEOs not to waste firms' financial resources and hence increase dividend payments. Fluck (1999) shows that CEOs distribute more dividends in firms with large outside shareholders in order not to use the firms' resources for private benefits and hence avoid the threat of dismissal. Finally, in model 7, both coefficients for *Institutional 3%* and *Overconfidence*Institutional 3%* are positive, but only

Table 5.6. Overconfidence and dividend levels: the interaction effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Overconfidence	-0.002 (-0.39)	-0.004 (-0.80)	-0.011*** (-2.67)	-0.017*** (-3.69)	-0.010 (-1.10)	-0.016*** (-3.53)	-0.017*** (-3.55)
Cash Flow	0.145*** (9.80)						
Overconfidence * Cash Flow	-0.062*** (-3.03)						
ROA		0.153*** (8.18)	0.117*** (7.66)	0.119*** (7.81)	0.117*** (7.65)	0.118*** (7.75)	0.118*** (7.74)
Overconfidence * ROA		-0.098*** (-3.44)					
Current Growth	-0.003 (-1.42)	-0.005** (-2.12)	-0.005* (-1.71)	-0.005** (-2.15)	-0.005** (-2.37)	-0.006** (-2.57)	-0.006** (-2.56)
Overconfidence *Current Growth			-0.002 (-0.41)				
Undervaluation		-0.004*** (-4.71)	-0.004*** (-4.66)	-0.006*** (-5.36)	-0.004*** (-4.64)	-0.004*** (-4.60)	-0.004*** (-4.60)
Overconfidence * Undervaluation				0.004*** (2.72)			
Leverage	-0.006** (-2.22)						
Size (Assets)	0.004** (2.50)	0.003** (2.16)	0.003** (2.05)	0.003** (1.99)	0.003** (2.04)	0.003** (2.18)	0.003** (2.08)
Tangibility	-0.011 (-1.52)	-0.008 (-1.16)	-0.006 (-0.85)	-0.006 (-0.76)	-0.006 (-0.86)	-0.007 (-0.99)	-0.006 (-0.83)
Stock Return	-0.0009 (-0.59)	-0.003 (-1.64)	-0.002 (-1.50)	-0.002 (-1.50)	-0.002 (-1.51)	-0.002 (-1.46)	-0.002 (-1.42)
Dividend Premium	-0.0006 (-0.28)	-0.001 (-0.45)	-0.0006 (-0.28)	-0.0006 (-0.26)	-0.0006 (-0.26)	-0.001 (-0.46)	-0.001 (-0.47)
Board Size	0.001* (1.92)	0.0009 (1.62)	0.001** (2.00)	0.001* (1.92)	0.001* (1.79)	0.001* (1.90)	0.001* (1.85)
Overconfidence * Board Size					-0.0001 (-0.13)		
Board Composition	0.006 (0.72)	0.006 (0.74)	0.005 (0.59)	0.008 (0.96)	0.005 (0.58)	0.005 (0.69)	0.005 (0.63)
Concentration 3%	0.0002*** (2.78)	0.0002*** (2.77)	0.0002*** (2.90)	0.0002*** (2.93)	0.0002*** (2.90)	0.0001* (1.70)	
Overconfidence * Concentration 3%						0.0002** (2.26)	
Institutional 3%							0.012 (1.57)
Overconfidence * Institutional 3%							0.024** (2.23)
Option Ownership	-0.253 (-1.49)	-0.236 (-1.39)	-0.214 (-1.24)	-0.212 (-1.24)	-0.223 (-1.30)	-0.231 (-1.36)	-0.211 (-1.23)
Stock Ownership	-0.004 (-0.11)	-0.014 (-0.39)	-0.018 (-0.46)	-0.018 (-0.49)	-0.017 (-0.45)	-0.015 (-0.40)	-0.009 (-0.23)
Duality	-0.002 (-0.63)	-0.003 (-0.89)	-0.002 (-0.65)	-0.002 (-0.86)	-0.002 (-0.63)	-0.002 (-0.61)	-0.002 (-0.64)
Age	0.0004* (1.87)	0.0005** (2.09)	0.0005* (1.95)	0.0005* (1.93)	0.0005** (1.96)	0.0005* (1.88)	0.0005* (1.85)
CEO Tenure	-0.0002 (-0.90)	-0.0002 (-0.92)	-0.0002 (-0.83)	-0.0002 (-0.83)	-0.0002 (-0.81)	-0.0002 (-0.79)	-0.0001 (-0.69)
CEO in Role	-0.0006** (-2.18)	-0.0006** (-2.41)	-0.0006** (-2.37)	-0.0006** (-2.50)	-0.0006** (-2.37)	-0.0006** (-2.21)	-0.0006** (-2.33)
Founder	0.002 (0.31)	0.002 (0.29)	0.003 (0.43)	0.003 (0.40)	0.003 (0.43)	0.003 (0.37)	0.004 (0.47)
British	0.008** (1.99)	0.007* (1.86)	0.007* (1.68)	0.008* (1.89)	0.007* (1.67)	0.007* (1.73)	0.007* (1.72)
Constant	-0.075*** (-3.22)	-0.056** (-2.40)	-0.053** (-2.22)	-0.050** (-2.14)	-0.053** (-2.19)	-0.053** (-2.25)	-0.050** (-2.13)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
χ^2	173.5***	167.7***	155.2***	162.8***	155.0***	160.5***	159.7***
Log likelihood	2092.5	2091.7	2085.9	2089.5	2085.8	2088.4	2087.9
Firms	103	103	103	103	103	103	103
Observations	972	972	972	972	972	972	972

Notes: This table reports outputs from a random-effects Tobit model on panel data. The dependent variable is *Dividends/Assets*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. *z* values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

significant for the latter. Economically, the outputs in model 7 (Appendix L Table A.5.6) imply that institutional ownership alone does not have any notable influence on dividends (as in Grinstein and Michaely, 2005). However, higher institutional ownership with overconfident managers leads to more dividend payments, i.e., institutional investors seem to prefer more dividends from overconfident CEOs. This result strengthens the role of institutional holdings in forcing agents to discharge their free cash flow and seek external finance from capital markets, which implies further monitoring of them. (Easterbrook, 1984).

5.6.4 Robustness tests

5.6.4.1 Another proxy of managerial overconfidence

The managerial overconfidence proxy used in Table 5.4 to 5.6 is based on Malmendier and Tate (2008), where a manager is identified as overconfident when they hold vested options that are at least 40% in the money. A further measure of managerial overconfidence is employed in this study following the approach of Campbell et al. (2011) and Hirshleifer et al. (2012).

Under this measure overconfidence takes the value of one once a CEO holds exercisable options that are at least 67% in the money, and zero otherwise. A CEO who is classified as overconfident by this measure remains so for the rest of the period. Malmendier et al. (2011) show the robustness of this measure after controlling for past stock returns.

In untabulated analyses, a random effects Tobit model is estimated using this measure of managerial overconfidence. The results reveal that the negative relationship between overconfidence and dividends remains robust to the inclusion of this measure.

5.6.4.2 Alternative measures of dividend policy

When dividend yield (*Dividends/MV*) is used as a dependent variable (Francis et al., 2011; Deshmukh et al., 2013) in models 1 and 2 of Table 5.7, managerial overconfidence is still negatively and significantly correlated with dividends. A similar result is obtained when *Pre-Holder* and *Post-Holder* are used instead of *Overconfidence*. This suggests that the negative impact of managerial overconfidence on dividend payments is persistent, as in Malmendier and Tate (2005a). The second alternative measure of dividends is *Dividends/Sales* (Chay and Suh, 2009) in models 3 and 4; the third definition is *Dividends/EBITDA* in models 5 and 6; and the fourth alternative is

*Dividends/Earnings*⁵⁴ in models 7 and 8. In all cases, the three different managerial overconfidence proxies are significantly and negatively correlated with dividend payments. Furthermore, in all models of Table 5.7, the coefficients of other variables are materially the same, indicating the robustness of the findings in the previous tables.⁵⁵

In economic terms as reported in Appendix L Table A.5.7, setting all other variable at their mean value, overconfident managers reduce dividends (measured as dividends to market value) by approximately 1.2% in Model 1 which is significant compared to the sample mean of 3%. When the dividend ratio is measured as dividends to sales (in Model 3), firms managed by overconfident CEOs predict a decline in dividends by about 1.3%. Dividends are predicted to be reduced by 4.8% (measured as dividends to EBITDA) in Model 5 and 8.1% (measured as dividend to Earnings) in Model 7 in firms run by overconfident managers, which are significant considering the sample means for dividends-to-EBITDA and dividend-to-Earnings are 20% and 35%, respectively.

5.6.4.3 Different definitions of explanatory variables

This section reruns the models using different measures of explanatory variables: *Size (Sales)* for firm size, *Leverage 2* for capital structure, *Concentration 5%* and *Largest Three* for concentration of stock ownership, *Institutional 5%* for institutional ownership, *Cash Flow 2* and *Cash Holdings* for the cash positions, *Tangibility* for investment levels, *RE/TA* for profitability, *Future Growth* and *Market-to-Book* for growth opportunities. All definitions are provided in Table 5.1. Furthermore, a new measure of board composition is employed: a dummy variable that is 1 if the proportion of outside directors is greater than 50% and 0 otherwise (Chen et al., 2005). In untabulated outputs (available upon request), the results remain robust to these alternatives by being qualitatively the same with the effect of managerial overconfidence on dividends continues to be significant and negative.

In addition I have re-estimated the models using the alternative proxy for undervaluation. I have constructed a dummy variable that is 1 for the top quintile based on the *Undervaluation* factor defined in Table 5.1; 0, otherwise (Ikenberry et al., 1995). The results confirm our findings that managerial overconfidence and stock undervaluation are negatively related to dividends. We also use the lower quintile to construct another dummy variable and find a

⁵⁴ This measure has some values that are negative or greater than 1, which are dropped from the sample.

⁵⁵ The results are replicated using *Institutional 3%* instead of *Concentration 3%* in Table 5.7. The findings do not alter any of the conclusions.

positive association between dividends and this dummy. This result thus provides further evidence that *Undervaluation* seems appropriate for detecting potentially undervalued stocks.

Table 5.7. Robustness checks: overconfidence and alternatives proxies of dividend policy

Dependent variables	Dividends/MV		Dividends/Sales		Dividends/EBITDA		Dividends/Earnings	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overconfidence	-0.014*** (-3.50)		-0.017*** (-2.73)		-0.056** (-2.40)		-0.091** (-2.43)	
Pre-Holder		-0.015*** (-3.38)		-0.021*** (-3.14)		-0.055** (-2.16)		-0.088** (-2.22)
Post-Holder		-0.013*** (-3.03)		-0.013** (-1.97)		-0.059** (-2.28)		-0.095** (-2.34)
ROA	0.078*** (4.46)	0.078*** (4.43)	0.109*** (4.92)	0.106*** (4.81)	0.419*** (4.34)	0.420*** (4.34)	0.511*** (3.55)	0.513*** (3.56)
Undervaluation	0.0006 (0.52)	0.0006 (0.53)	-0.005*** (-3.81)	-0.005*** (-3.81)	-0.024*** (-3.96)	-0.024*** (-3.96)	-0.020** (-2.18)	-0.020** (-2.19)
Size (Assets)	0.006*** (3.93)	0.006*** (3.93)	0.014*** (5.92)	0.014*** (5.92)	0.030*** (3.48)	0.030*** (3.48)	0.048*** (3.36)	0.048*** (3.36)
Current Growth	-0.008*** (-2.76)	-0.008*** (-2.76)	-0.008** (-2.37)	-0.008** (-2.38)	-0.041*** (-2.59)	-0.041*** (-2.58)	-0.034 (-1.48)	-0.034 (-1.47)
Tangibility	-0.0028 (-0.39)	-0.003 (-0.41)	-0.033*** (-2.96)	-0.034*** (-3.01)	-0.110*** (-2.58)	-0.109** (-2.57)	-0.010 (-0.13)	-0.009 (-0.12)
Stock Return	-0.007*** (-3.70)	-0.007*** (-3.70)	-0.002 (-0.66)	-0.002 (-0.65)	-0.028** (-2.56)	-0.028** (-2.57)	-0.032** (-2.11)	-0.032** (-2.11)
Dividend Premium	-0.003 (-1.10)	-0.003 (-1.14)	-0.004 (-1.15)	-0.005 (-1.35)	0.005 (0.33)	0.005 (0.36)	-0.021 (-0.96)	-0.020 (-0.92)
Board Size	-0.0001 (-0.22)	-0.0002 (-0.23)	0.0003 (0.30)	0.0002 (0.23)	0.003 (0.78)	0.003 (0.79)	0.015*** (2.58)	0.015*** (2.59)
Board Composition	-0.013 (-1.36)	-0.013 (-1.36)	0.002 (0.15)	0.002 (0.14)	0.014 (0.26)	0.014 (0.26)	-0.014 (-0.19)	-0.015 (-0.19)
Concentration 3%	0.0002** (2.17)	0.0002** (2.17)	0.0003*** (2.82)	0.0003*** (2.78)	0.001*** (3.08)	0.001*** (3.09)	0.002*** (3.44)	0.002*** (3.45)
Option Ownership	-0.236 (-1.11)	-0.225 (-1.05)	-0.013 (-0.05)	0.059 (0.23)	-2.420** (-2.07)	-2.454** (-2.08)	-1.044 (-0.60)	-1.111 (-0.63)
Stock Ownership	-0.023 (-0.67)	-0.023 (-0.68)	-0.012 (-0.20)	-0.015 (-0.26)	-0.066 (-0.33)	-0.065 (-0.33)	-0.260 (-0.79)	-0.256 (-0.78)
Duality	0.003 (0.97)	0.003 (0.98)	0.004 (0.99)	0.004 (1.00)	-0.012 (-0.63)	-0.012 (-0.63)	-0.039 (-1.40)	-0.039 (-1.40)
Age	0.0004* (1.73)	0.0004* (1.65)	0.0005 (1.48)	0.0004 (1.14)	0.003* (1.96)	0.003** (1.96)	0.005** (2.05)	0.005** (2.06)
CEO Tenure	-0.00007 (-0.34)	-0.00008 (-0.36)	-0.0003 (-1.08)	-0.0004 (-1.15)	0.0003 (0.22)	0.0003 (0.23)	0.001 (0.61)	0.001 (0.62)
CEO in Role	-0.0003 (-1.04)	-0.0003 (-1.02)	-0.0006 (-1.44)	-0.0005 (-1.34)	-0.005*** (-3.23)	-0.005*** (-3.23)	-0.007*** (-2.78)	-0.007*** (-2.79)
Founder	-0.006 (-0.82)	-0.005 (-0.81)	-0.002 (-0.18)	-0.002 (-0.13)	0.044 (1.09)	0.043 (1.08)	-0.026 (-0.37)	-0.027 (-0.38)
British	0.005 (1.20)	0.005 (1.19)	0.009 (1.39)	0.009 (1.36)	0.055** (2.29)	0.055** (2.29)	0.062 (1.62)	0.063 (1.62)
Constant	-0.070*** (-3.03)	-0.069*** (-2.99)	-0.184*** (-5.03)	-0.177*** (-4.83)	-0.380*** (-2.80)	-0.383*** (-2.80)	-0.720*** (-3.23)	-0.726*** (-3.23)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
χ^2	170.5	170.8	131.0	135.3	120.2	120.1	94.59	94.55
Log likelihood	1890.8	1890.8	1730.4	1731.9	403.7	403.8	98.32	98.35
Firms	103	103	103	103	103	103	103	103
Observations	972	972	971	971	972	972	834	834

Notes; This table reports outputs from a random-effects Tobit model on panel data. The dependent variable is one of the proxies shown as above. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. z values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

5.6.4.4 Tobit model on pooled data

As a further robustness check, all models in Table 5.4 are re-estimated using Tobit models with pooled data and by clustering the standard errors at the firm level. The results are reported in Table 5.8. In models 1 to 10, *Overconfidence* coefficients are consistently negative and statistically significant. Furthermore, the coefficients on *Pre-Holder* and *Post-Holder* are statistically negative in model 11.

Table 5.8. Overconfidence and dividend levels: pooled Tobit estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Overconfidence	-0.013** (-2.44)	-0.010*** (-2.76)	-0.010** (-2.50)	-0.011*** (-2.78)	-0.012** (-2.58)	-0.012*** (-3.34)	-0.013** (-2.39)	-0.012** (-2.24)	-0.011* (-1.68)	-0.011*** (-2.65)	
Pre-Holder											-0.012*** (-2.70)
Post-Holder											-0.010** (-2.09)
Cash Flow		0.238*** (5.92)		0.221*** (5.40)							
Leverage		0.0004 (0.10)				-0.004 (-1.05)					
Size (Assets)		0.0008 (0.72)	0.0004 (0.35)	0.0007 (0.62)	-0.002 (-0.92)	0.0002 (0.17)				-0.001 (-0.69)	-0.001 (-0.68)
Current Growth		-0.009*** (-2.85)	-0.009*** (-2.86)	-0.010*** (-3.02)	-0.011*** (-3.66)	-0.012*** (-3.60)				-0.012*** (-4.05)	-0.012*** (-4.05)
Tangibility		-0.014* (-1.82)	-0.012* (-1.71)	-0.013* (-1.75)	0.007 (0.75)	-0.003 (-0.49)				-0.005 (-0.75)	-0.005 (-0.78)
Stock Return		-0.007*** (-3.71)	-0.007*** (-3.18)	-0.009*** (-4.17)	-0.010*** (-4.33)	-0.009*** (-4.45)				-0.009*** (-3.92)	-0.009*** (-3.92)
Dividend Premium		0.003 (1.18)	0.004* (1.69)	0.003 (1.36)	0.002 (0.72)	0.002 (0.69)				0.002 (0.74)	0.002 (0.59)
Profitability			0.241*** (5.38)								
Undervaluation			-0.003** (-2.16)	-0.002 (-1.58)	-0.014*** (-5.66)					-0.004** (-2.53)	-0.003** (-2.51)
Investment					-0.108** (-2.23)						
ROA						0.297*** (5.44)				0.265*** (5.05)	0.264*** (5.02)
Board Size							0.001 (1.41)	0.002** (2.17)		0.002** (2.16)	0.002** (2.17)
Board Composition							0.012 (0.74)	0.019 (1.18)		0.005 (0.42)	0.005 (0.45)
Institutional 3%							0.019 (1.13)				
Concentration 3%								0.0003** (2.53)		0.0002** (2.42)	0.0002** (2.46)
Option Ownership									-1.162*** (-2.75)	-0.880** (-2.45)	-0.872** (-2.40)
Stock Ownership									0.103** (2.54)	0.0255 (0.79)	0.0251 (0.78)
Duality									-0.003 (-0.40)	-0.006 (-1.24)	-0.006 (-1.22)
Age									-0.0002 (-0.62)	-0.000007 (-0.02)	-0.00001 (-0.04)
CEO Tenure									0.00006 (0.21)	-0.0003 (-1.35)	-0.0003 (-1.36)
CEO in Role									-0.0003 (-0.56)	-0.0004 (-1.10)	-0.0004 (-1.08)
Founder									-0.001 (-0.09)	0.001 (0.16)	0.001 (0.18)
British									0.002 (0.28)	0.007 (1.44)	0.007 (1.41)
Constant	0.028*** (6.07)	-0.005 (-0.35)	0.0002 (0.01)	0.002 (0.14)	0.079*** (2.86)	0.012 (0.83)	0.010 (0.69)	-0.004 (-0.26)	0.041** (2.03)	0.015 (0.61)	0.015 (0.60)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prob > F	0.091	0	0	0	0	0	0.015	0	0	0	0
Log likelihood	1622.5	1846.0	1855.9	1849.1	1718.4	1831.4	1629.0	1639.4	1658.0	1879.2	1879.4
Firms	103	103	103	103	103	103	103	103	103	103	103
Observations	972	972	972	972	972	972	972	972	972	972	972

Notes: This table reports outputs from a pooled Tobit model on panel data. The dependent variable is *Dividends/Assets*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. The *t*-statistics are based on standard errors clustered at firm level, which are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

These results again indicate the robustness of the findings. That is, overconfident CEOs pay less dividends compared with rational CEOs.

The results in all models show that, generally, firm-specific variables continue to hold their association with dividends. The relationship between corporate governance and managerial overconfidence also remains the same: *Board Size* and *Concentration 3%* are positively correlated with dividend payments. However, the relationship between CEOs characteristics and dividends differs significantly compared with the results in Table 5.4. The coefficient on *Option Ownership* becomes negative and significant. These findings confirm De Cesari and Ozkan (2015) who report a negative link between dividends and CEO options in the UK using pooled Tobit regressions. The results also show that the factors *Age*, *CEO in Role* and *British* are not correlated with dividend policy. Although there are slight changes in the correlation between dividends and these explanatory variables, most of the other coefficients hold their signs and significance levels.

Economically, in Model 10 (Appendix L Table A.5.8) for example, overconfident managers decreases dividends by 0.9% compared to rational manager (holding all other variables at their mean values). Overall the results confirm that CEO overconfidence plays a role in reducing dividend payments.

5.7 Overconfidence, share repurchases and total payout

5.7.1.1 Managerial overconfidence and share repurchases

This section examines the relationship between managerial overconfidence and share repurchases. The dependent variables are *Repurchases/Assets*, *Repurchases/MV*, *Repurchases/Earnings* and *Repurchases (Dummy)*, which are defined in Table 5.1. The results are provided in Table 5.9. The estimated coefficients for *Overconfidence* are positive but insignificant in models 1 to 6, indicating that share repurchases in firms managed by overconfident CEOs are not significantly different from those managed by rational peers. The results are in line with Deshmukh et al. (2013).

The *Undervaluation* coefficient is negative in models 1 to 6 but significant only in models 5 and 6. This negative relationship suggests that (potentially) undervalued British firms do not use open market share repurchases to signal their undervaluation and hence transfer wealth to shareholders.⁵⁶ This finding is inconsistent with the undervaluation hypothesis (Dann, 1981;

⁵⁶ The results hold when we use alternative measures of stock undervaluation as explained in the previous section.

Ikenberry et al., 1995) but confirm Haw et al. (2013) who find that managers tend to use open market share repurchases without signalling implications. Also, our findings are in agreement with Crawford and Wang (2012), who report that UK firms that repurchase their shares do not suffer from undervaluation, but rather do it to distribute excess cash. In addition, the coefficient on *Tangibility* is positive in models 1 to 6, but significant only in models 3 to 6.

Table 5.9. Overconfidence and share repurchases

Dependent variables	Repurchases/Assets		Repurchases/MV		Repurchases/Earnings		Repurchases (Dummy)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overconfidence	0.010 (0.98)	0.010 (1.02)	0.006 (0.82)	0.006 (0.84)	0.067 (1.41)	0.068 (1.44)	0.501* (1.75)	0.505* (1.76)
ROA	0.210*** (4.45)	0.213*** (4.52)	0.141*** (3.79)	0.143*** (3.85)	0.998*** (4.15)	1.009*** (4.20)	3.987*** (3.03)	4.060*** (3.07)
Undervaluation	-0.003 (-1.05)	-0.003 (-1.06)	-0.002 (-0.83)	-0.002 (-0.82)	-0.030* (-1.84)	-0.030* (-1.84)	-0.165* (-1.93)	-0.164* (-1.91)
Size (Assets)	0.010*** (2.75)	0.010*** (2.92)	0.009*** (3.53)	0.010*** (3.68)	0.067*** (3.92)	0.070*** (4.05)	0.298*** (3.00)	0.311*** (3.12)
Current Growth	-0.035*** (-3.62)	-0.035*** (-3.60)	-0.023*** (-2.92)	-0.022*** (-2.90)	-0.187*** (-3.65)	-0.186*** (-3.63)	-0.603** (-2.39)	-0.600** (-2.38)
Tangibility	0.018 (1.04)	0.017 (1.01)	0.023* (1.84)	0.024* (1.86)	0.139* (1.66)	0.137* (1.65)	0.757 (1.62)	0.756 (1.62)
Stock Return	-0.005 (-0.90)	-0.005 (-0.92)	-0.005 (-1.25)	-0.005 (-1.26)	-0.028 (-1.04)	-0.028 (-1.04)	-0.164 (-1.12)	-0.163 (-1.12)
Dividend Premium	0.002 (0.35)	0.002 (0.27)	-0.0004 (-0.07)	-0.001 (-0.17)	-0.008 (-0.22)	-0.010 (-0.30)	0.155 (0.84)	0.139 (0.76)
Board Size	0.002 (1.12)	0.002 (1.16)	0.0006 (0.46)	0.0006 (0.47)	0.006 (0.69)	0.006 (0.73)	0.037 (0.79)	0.037 (0.79)
Board Composition	0.019 (0.78)	0.020 (0.82)	0.002 (0.10)	0.002 (0.12)	0.062 (0.50)	0.067 (0.54)	0.375 (0.55)	0.392 (0.57)
Institutional 3%	0.014 (0.61)		-0.0002 (-0.01)		0.058 (0.49)		0.007 (0.01)	
Concentration 3%		0.0002 (1.18)		0.0001 (0.55)		0.001 (0.92)		0.003 (0.46)
Option Ownership	0.204 (0.39)	0.215 (0.41)	-0.256 (-0.58)	-0.247 (-0.56)	0.0469 (-1.48)	0.4945 (-1.51)	11.56 (0.75)	11.89 (0.77)
Stock Ownership	-0.012 (-0.15)	-0.024 (-0.29)	-0.003 (-0.05)	-0.006 (-0.11)	0.135 (0.34)	0.091 (0.23)	0.618 (0.27)	0.517 (0.22)
Duality	-0.007 (-0.83)	-0.007 (-0.84)	-0.002 (-0.27)	-0.002 (-0.27)	-0.007 (-0.17)	-0.007 (-0.18)	-0.125 (-0.56)	-0.128 (-0.57)
Age	-0.0007 (-1.19)	-0.0007 (-1.19)	-0.001** (-2.34)	-0.001** (-2.35)	-0.005 (-1.60)	-0.005 (-1.61)	-0.026 (-1.54)	-0.026 (-1.55)
CEO Tenure	-0.0006 (-1.12)	-0.0006 (-1.19)	-0.0004 (-0.87)	-0.0004 (-0.90)	-0.001 (-0.51)	-0.002 (-0.57)	-0.003 (-0.18)	-0.003 (-0.19)
CEO in Role	0.0008 (1.15)	0.0009 (1.19)	0.001* (1.96)	0.001** (1.97)	0.004 (0.97)	0.004 (1.00)	0.022 (1.08)	0.023 (1.10)
Founder	0.005 (0.30)	0.004 (0.27)	0.001 (0.08)	0.0009 (0.08)	-0.047 (-0.60)	-0.049 (-0.63)	-0.241 (-0.54)	-0.241 (-0.54)
British	0.031*** (3.12)	0.032*** (3.17)	0.013* (1.81)	0.014* (1.83)	0.112** (2.32)	0.114** (2.37)	0.723** (2.50)	0.727** (2.51)
Constant	-0.202*** (-3.66)	-0.216*** (-3.86)	-0.136*** (-3.26)	-0.146*** (-3.44)	-1.136*** (-4.12)	-1.194*** (-4.25)	-5.011*** (-3.22)	-5.307*** (-3.35)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
χ^2	134.2***	135.2***	122.5***	123.0***	137.8***	138.5***	99.92***	99.93***
Log likelihood	310.2	310.7	363.5	363.7	-216.6	-216.3	-432.2	-432.1
Firms	103	103	103	103	103	103	103	103
Observations	972	972	972	972	958	958	972	972

Notes: This table reports outputs from a random-effects Tobit model on panel data. The dependent variable is one of the proxies shown as above. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. *z* values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

The significant association implies that UK firms with lower information asymmetries engage more in share repurchases than those with higher asymmetric information, which is consistent with Barth and Kasznik (1999) in the US. However, this finding contradicts the argument that

a high degree of asymmetric information should be positively correlated with share repurchases.

The coefficients on *Size* and *ROA* in models 1 to 6 are positive and highly significant, which indicates that larger and more profitable UK firms acquire more shares than their peers, which is in line with Dittmar (2000) and Jagannathan and Stephens (2003). The literature suggests that growth based firms tend to accumulate more cash for their investments and hence reduce the payouts (Dittmar, 2000; Grullon and Michaely, 2004). Open market share repurchases would represent one of the distribution mechanisms that lower growth firms may use to distribute their excess cash to shareholders. The results in Table 5.9 are consistent with this hypothesis as the coefficients on *Current Growth* are negative and significant in all models.

The corporate governance variables in Table 5.9 are statistically insignificant, which rule out the influence of share repurchases in mitigating the agency costs in the UK, being consistent with Haw et al. (2013). These findings may refer to the role of corporate governance with respect to share repurchases in the UK, as CEOs are given the right, but not the obligation, by the board of directors to buy back a certain amount of the company's shares through open market repurchases, which has to be approved and disclosed in the annual report in the preceding year; this task can be accomplished within one year. This flexibility might rule out the influence of corporate governance on CEOs to engage in open market repurchases.

Furthermore, the significantly positive coefficients for *British* in Table 5.9 reveal that UK CEOs engage more in open market share repurchases relative to non-British CEOs. The findings also show that *Age (CEO in Role)* is negatively (positively) correlated with share repurchases in the UK, which are significant in models 3 and 4. Models 7 and 8 in Table 5.9 report the estimates for the influence of managerial overconfidence on the likelihood of open market share repurchases. The results reveal that firms with overconfident managers are more likely to engage in open market share repurchases compared with those with non-overconfident managers. The rest of the explanatory variables continue to retain their signs and significance levels. Overall, Table 5.9 implies that managerial overconfidence is more likely to influence the *propensity* to conduct share repurchases rather than affecting the *amount* of share repurchases.⁵⁷

⁵⁷ Ben-David et al. (2007) find that overconfident CFOs are more likely to pay less dividends and more likely to repurchase shares. The latter finding is in line with our results.

In economic terms, setting all variables at their mean values, the predicted probability of a repurchase is 12% greater in firms run by overconfident managers than for those managed by rational peers (in Model 7 and Model 8 of Appendix L Table A.5.9).

5.7.1.2 Managerial overconfidence and total payout

This section investigates the relationship between managerial overconfidence and total payout (cash dividends and share repurchases). The dependent variables are *Payout/Assets*, *Payout/MV*, *Payout/Earnings* and *Payout (Dummy)* (Fenn and Liang, 2001; Grullon and Michaely, 2002). The results are presented in Table 5.10. The coefficients on *Overconfidence* are negative but insignificant in models 1, 2, 5 and 6. However, when the dependent variable is *Payout/MV*, the results reveal that higher overconfidence is negatively and significantly associated with total payouts. Furthermore, we find no evidence on the effect of managerial overconfidence on the propensity of firms to change their total payout, as shown in models 7 and 8. The rest of the explanatory variables continue to hold their signs in all models. Deshmukh et al. (2013) find no relationship between overconfident CEOs and payout policy. The less significant results in our study regarding the relationship between overconfidence and total payout might be attributed to the differences between dividends and share repurchases as documented in the literature. Firms tend to be more reluctant to reduce dividends than repurchase shares. Jagannathan et al. (2000) report that firms use permanent earnings to pay dividends where share repurchases are paid out from temporary earnings. Thus, share repurchases are more flexible and more volatile than dividends. Other studies show that firms engage in share repurchases due to other factors such as when the stock price is low and when there is excess cash (e.g., Grullon and Michaely, 2004; Brav et al., 2005). These features of share repurchases make total payout policies less predictable, which in turn explains the weaker link between managerial overconfidence and payout policy.

In addition to statistical significance in models 3 and 5, these results are economically significant as shown in Appendix L Table A.5.10. Fixing all other variables at their mean values, firms with overconfident CEOs predicted decreases in total payout (measured as payout to market value) by approximately 0.9% (in Model 3) and 0.9% (in Model 4), which is relatively significant given the sample mean of 4%.

Table 5.10. Overconfidence and total payout

Dependent variables	Payout/Assets		Payout/MV		Payout/Earnings		Payout (Dummy)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overconfidence	-0.007 (-1.08)	-0.006 (-1.03)	-0.011** (-2.31)	-0.011** (-2.26)	-0.038 (-1.18)	-0.037 (-1.15)	-1.295 (-1.52)	-1.209 (-1.38)
ROA	0.206*** (7.51)	0.207*** (7.56)	0.152*** (5.87)	0.151*** (5.86)	0.490*** (3.78)	0.492*** (3.80)	12.68*** (4.02)	12.74*** (3.96)
Undervaluation	-0.004*** (-2.78)	-0.004*** (-2.78)	0.003 (1.64)	0.003* (1.65)	-0.025*** (-2.96)	-0.025*** (-2.96)	-0.740*** (-3.15)	-0.757*** (-3.03)
Size (Assets)	0.006** (2.51)	0.006*** (2.62)	0.008*** (4.57)	0.008*** (4.60)	0.044*** (3.80)	0.045*** (3.86)	1.953*** (3.90)	2.040*** (3.61)
Current Growth	-0.013*** (-3.27)	-0.013*** (-3.25)	-0.015*** (-3.33)	-0.015*** (-3.32)	-0.067*** (-3.18)	-0.066*** (-3.17)	-1.090** (-2.07)	-1.152** (-2.12)
Tangibility	-0.012 (-1.06)	-0.013 (-1.18)	0.005 (0.57)	0.004 (0.47)	-0.049 (-0.86)	-0.053 (-0.93)	2.571 (1.52)	2.312 (1.38)
Stock Return	-0.003 (-1.16)	-0.003 (-1.18)	-0.010*** (-3.11)	-0.010*** (-3.12)	-0.042*** (-2.95)	-0.042*** (-2.95)	0.134 (0.39)	0.105 (0.30)
Dividend Premium	-0.002 (-0.47)	-0.002 (-0.43)	-0.005 (-1.19)	-0.005 (-1.16)	-0.016 (-0.81)	-0.016 (-0.81)	-1.001 (-1.32)	-1.107 (-1.37)
Board Size	0.001 (1.22)	0.001 (1.32)	-0.0007 (-0.80)	-0.0006 (-0.71)	0.006 (1.23)	0.007 (1.29)	-0.168 (-1.02)	-0.186 (-1.10)
Board Composition	0.006 (0.42)	0.007 (0.49)	-0.023* (-1.72)	-0.022* (-1.65)	-0.020 (-0.28)	-0.016 (-0.23)	-2.451 (-1.08)	-2.521 (-1.11)
Institutional 3%	0.030** (2.56)		0.018 (1.52)		0.089 (1.44)		2.894 (1.56)	
Concentration 3%		0.0003*** (2.92)		0.0002 (1.63)		0.0009* (1.70)		0.034* (1.83)
Option Ownership	-0.139 (-0.48)	-0.148 (-0.51)	-0.495 (-1.61)	-0.497 (-1.62)	0.934 (0.60)	0.907 (0.58)	40.18 (0.89)	36.87 (0.80)
Stock Ownership	0.021 (0.39)	0.006 (0.11)	0.004 (0.11)	-0.007 (-0.17)	-0.013 (-0.05)	-0.057 (-0.21)	-2.786 (-0.41)	-4.879 (-0.71)
Duality	-0.008* (-1.73)	-0.008* (-1.75)	0.002 (0.41)	0.002 (0.36)	-0.042* (-1.66)	-0.043* (-1.69)	-1.116 (-1.54)	-1.120 (-1.51)
Age	0.0003 (0.81)	0.0003 (0.82)	0.0001 (0.45)	0.0001 (0.45)	0.0013 (0.66)	0.001 (0.67)	0.088 (1.55)	0.091 (1.56)
CEO Tenure	-0.0002 (-0.54)	-0.0002 (-0.65)	-0.0001 (-0.37)	-0.0001 (-0.48)	0.0004 (0.24)	0.0003 (0.18)	0.237*** (2.80)	0.233** (2.56)
CEO in Role	-0.0004 (-0.88)	-0.0004 (-0.82)	0.00001 (0.04)	0.00004 (0.10)	-0.001 (-0.62)	-0.001 (-0.60)	-0.061 (-0.87)	-0.057 (-0.82)
Founder	0.0018 (0.17)	0.0007 (0.07)	-0.006 (-0.72)	-0.006 (-0.78)	-0.047 (-0.84)	-0.051 (-0.91)	-1.526 (-0.86)	-1.683 (-0.94)
British	0.019*** (2.99)	0.020*** (3.09)	0.010* (1.88)	0.010** (1.98)	0.066** (2.01)	0.067** (2.07)	3.106** (2.19)	3.200** (2.25)
Constant	-0.097*** (-2.80)	-0.103*** (-2.96)	-0.092*** (-3.29)	-0.094*** (-3.34)	-0.467*** (-2.62)	-0.488*** (-2.73)	-27.42*** (-3.89)	-28.80*** (-3.73)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
χ^2	182.3***	184.1***	190.4***	190.7***	108.5***	109.4***	35.37	30.61
Log likelihood	1628.8	1629.8	1557.6	1557.8	167.6	168.0	-101.7	-101.1
Firms	103	103	103	103	103	103	94	94
Observations	972	972	972	972	877	877	888	888

Notes; This table reports outputs from a random-effects Tobit model on panel data. The dependent variable is one of the proxies shown as above. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. z values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

5.8 Conclusion

The research on managerial overconfidence and dividends has recently become more developed, but is little understood. We, thus, examine the influence of managerial overconfidence, corporate governance factors and CEO characteristics on corporate payout policy in the UK for the period between 2000 and 2012. We contribute to the literature in several ways. First, our findings add to the literature on behavioural corporate finance, and specifically to the emerging literature on the relationship between managerial overconfidence

and dividend policy. Secondly, our study focusses on dividend policy in the UK, and we confirm the negative impact of overconfident CEOs on both the amount of, and the propensity to pay dividends outside the US. Thirdly, the findings reinforce the importance of firm-specific factors in explaining some of the variations in dividends. That is, we demonstrate that dividends are positively correlated with firm size, profitability and cash flow; and negatively correlated with leverage and investment. Interestingly, we also find that firms which are potentially undervalued distribute less dividends and are less likely to pay dividends. Moreover, we find no support for the catering theory of dividends in the UK.

The results further show that firms with strong corporate governance (i.e., larger board size, higher institutional holdings and more outside shareholders) distribute more dividends. However, none of these factors have an influence on the *propensity* to pay dividends. CEO traits are also shown to influence dividend levels and the likelihood of paying dividends. Our empirical analysis further detects that the presence of overconfident CEOs reduces the positive association between cash flows and dividend payments. Also, the relationship between growth and dividends is negative and insensitive to whether managers are overconfident. Our results show that overconfident managers in undervalued firms reduce dividends less compared to when managers are rational for the same type of firms. Moreover, larger board size is positively associated with dividends, and this correlation remains the same in firms run by overconfident managers compared to those run by rational counterparts. Finally, in the presence of overconfident CEOs, firms with high institutional ownership and larger outside shareholders distribute more cash dividends.

A further contribution of our analysis is that, in addition to dividends, we consider the effect of managerial overconfidence on share repurchases and total payout. When we investigate the effect of managerial overconfidence on share buyback and total payout policies, the findings are less conclusive. Nevertheless, we showed that higher overconfidence tends to have a direct effect on the amount of share repurchases, and increases the *probability* of conducting share buybacks. Furthermore, the relationship between managerial overconfidence and total payout is negative, but it is significant only when the dependent variable is payouts scaled by the market value of equity.

We suggest that studies extend this approach, and compare the market reaction to dividend announcements in firms with overconfident CEOs compared with those with rational peers. Deshmukh et al. (2013) study this relationship in cases of dividend increases in the US for the period from 1984 to 1994. The announcement effect of dividend decreases and no change in

dividends remains unexplored. Furthermore, the mixed results on the relationship between dividend changes and future earnings in the literature could be attributed to managerial overconfidence. These are open questions which we leave for future research.

Chapter 6: Conclusion, limitations and future research

Corporate payout policy has continued to puzzle scholars for over five decades. Financial economists have extensively studied dividend policy and its effect on firm's value, and have proposed different theories to explain the dividend puzzle. Prior hypotheses are developed based on traditional finance which assumes that agents are fully rational, self-interested and work towards maximizing shareholders value. In spite of the vast research in this area, no conclusions have been made on the signalling theory of dividends.

Emerging research in behavioural corporate finance relaxes the assumption from traditional finance of rational agents, and investigates the impact of managerial cognitive biases on corporate dividend policy. Some recent studies in this field have emerged, but as yet are little understood.

The objective of this thesis was to explore the existing puzzles in corporate payout policy in terms of both standard and behavioural corporate finance. Although the thesis consists of three standalone, separate publishable chapters, these chapters are linked by the following common research theme: the impact of standard agency and information/signalling problems on dividend policy, together with the behavioural factor which is managerial overconfidence.

The first empirical chapter (chapter 3) examines the signalling theory of dividends in Oman. Next, chapter 4 considers a theoretical model which examines the combined effects of managerial overconfidence and moral hazard/agency problems on dividend policy. Finally, chapter 5 provides an empirical analysis of managerial overconfidence and dividend policy in the UK.

A prominent theory in this area of the literature is the information content or the signalling theory. The signalling theory is based on the notion that information is asymmetric. It suggests that dividends can be used as a signalling mechanism, given the assumption that investors and managers do not have equal access to firm's information. Managers use dividends to convey information to the market about firms' prospects (Bhattacharya, 1979; John and Williams, 1985; Miller and Rock, 1985). The earlier works examining the signalling theory of dividends test the market reaction to the dividend announcement, and the relationship between dividend changes and future earnings.

Several studies in developed and developing markets find evidence on the association between dividend announcements and stock price reactions (e.g., Aharony and Swary, 1980; Nissim and Ziv, 2000; Al-Yahyaee et al., 2011). However, results on the correlation between dividend

changes and earnings reveal mixed results. The earlier works of Nissim and Ziv (2000), Harada and Nguyen (2005) and Dasilas and Leventis (2011) find support for the signalling theory, while Benartzi et al. (1997) and Grullon et al. (2005) detect no evidence on the association between dividend changes and future earnings.

Emerging research in behavioural corporate finance examines the effect of managerial psychological biases on corporate financial decisions. Managerial overconfidence is the dominant managerial bias that most of the studies focus on. An extensive body of academic literature studies the influence of overconfident CEOs on investment and capital structure decisions (e.g., Heaton, 2002; Malmendier and Tate, 2005a; Malmendier and Tate, 2005b; Doukas and Petmezas, 2007; Liu and Taffler, 2008; Malmendier and Tate, 2008; Croci et al., 2010; Campbell et al., 2011; Malmendier et al., 2011). The effect of managerial overconfidence on corporate payout policy is now emerging but is little understood.

The information content of dividends and factors affecting changes in dividends have been discussed in Chapter 3. Oman provides a unique institutional setting to re-examine the signalling theory of dividends. In Oman, dividends and capital gains are not taxed and firms tend to change their dividend levels more frequently. Furthermore, those firms depend heavily on banking finance and have high ownership concentrations. Unlike in the developed markets, Omani firms have low corporate disclosure requirements, low transparency, unpublished earnings forecasts and few professional analysts.

The vast majority of theoretical and empirical studies examining the dividend signalling hypothesis are conducted in developed markets and have argued that taxes on dividends (Black, 1976), as well as the poor information environment (Aggarwal et al., 2012) provide support for the information content of dividends. However, the high frequency of dividend changes (Chen et al., 2002), high ownership concentration and heavy reliance on bank financing of Omani firms should rule out the credibility of dividend signalling.

This chapter provides several contributions to the existing literature. First, this study provides evidence on the tax-based signalling theory (Black, 1976). We find that dividends do not signal future profitability when investors' dividends are not taxed. Second, the analyses reveal that in a poor information environment, dividend changes are not informative about future earnings changes (this is inconsistent with Aggarwal et al., 2012). Third, the tendency of firms to change their dividend policy more frequently in Oman is shown to be correlated with current earnings

changes. Therefore, investors should not view dividend changes as a signal of the future profitability of Omani firms.

Another issue on the effect of managerial overconfidence on dividend policy was investigated in Chapters 4 and 5. Chapter 4 developed theoretical models to demonstrate the relationship between overconfidence, dividend policy and firm value. Wu and Liu (2008) theoretically show that dividends and overconfidence should be positively correlated, while Deshmukh et al. (2013) develop a theoretical model that demonstrates that overconfidence leads to lower dividends. Unlike those studies, this chapter incorporated moral hazard and specifically investigated the conditions under which the relationship between managerial overconfidence and dividends would be negative or positive. Also, it demonstrated the effect of an overconfident CEO's dividend announcement on firm's value. Furthermore, it shows that bounded rationality does have an impact on the relationship between overconfidence and dividend policy.

This paper contributes to the emerging research in behavioural corporate finance by showing under which conditions the relationship between managerial overconfidence and dividend policy could be positive and negative. An increase in dividends occurs when managers are overconfident about their current ability (as in Model 1) while the opposite tendency was found among managers who are overconfident about their future ability (as in Model 2). In both models, the effect on firm value is ambiguous. These findings explain the contradictory results in prior studies (Wu and Liu, 2008; Deshmukh et al., 2013). A further contribution of our analysis was to consider managerial bounded rationality. This study revealed that managerial bounded rationality could provide additional explanations for the variation in corporate dividend policy across firms.

The third topic examined in Chapter 5 is the relationship between managerial overconfidence and corporate dividend policy in the UK. Investigating this issue is important because the majority of the earlier studies were conducted in the US; using data over the period 1980-1994; and do not control for corporate governance factors. Further, the corporate governance mechanism is better in the UK than the US. If corporate governance could mitigate problems associated with managerial overconfidence, we would expect our results to differ from those in the US (e.g., Cordeiro, 2009; Deshmukh et al., 2013).

Chapter 5 contributes to the recent studies by showing that the impact of managerial overconfidence on dividend policy continues to hold outside the US. Our results showed that

managerial overconfidence leads to a reduction in the amount of and the likelihood of payment of dividends in the UK. Another contribution regards the relationship between overconfident CEOs and dividends in firms that exhibit potential undervaluation. The finding revealed that in undervalued firms, overconfident CEOs reduce dividends less compared with rational peers. This result is inconsistent with the assumption of earlier studies where they argue that overconfident managers reduce dividends because they believe that the market undervalues their firms (e.g., Cordeiro, 2009; Deshmukh et al., 2013). Other interesting contributions are shown in the relationship between corporate governance factors and dividend policy. We find that corporate governance factors affect the amount of, but not the propensity to pay dividends in the UK. Moreover, the results revealed that overconfident CEOs in firms with a high ownership concentration and institutional holdings pay more dividends compared with rational managers.

In general, the results in this thesis provide additional contributions to the existing research on the information content of dividends and to the growing literature in behavioural corporate finance. However, we acknowledge inherent limitations within this study.

6.1 Limitations of the thesis

This thesis explores three different issues in corporate dividend policy. Although the best efforts were made to provide a rigorous investigation of those the issues, these studies possess some limitations, as follows:

The first topic examines the informational content of dividends, and factors that influence dividend changes in a unique institutional setting: Oman. For future research, it would be desirable to have a higher number of observations in order to make the findings more generalisable to other countries. Another limitation of this chapter is related to the matching sample approach. Specifically, firms are matched according to their industry (similar to Fairchild et al., 2014). However, it would be more appropriate to match firms based on additional factors such as firms' size, profitability and amount of dividend changes (e.g., Benartzi et al. 1997). Moreover, this study does not consider other factors that are documented in the literature which influence corporate dividend policy. For example, corporate governance and managerial compensation are not controlled for, when investigating the factors that have driven dividend changes in the Omani market. However, these variables are neither available from the Muscat Stock Market (MSM) nor in firms' annual reports.

The empirical chapter that focuses on the effect of overconfidence on dividend policy in the UK uses a relatively small number of firm-year observations (972 observations). This was due to the sample selection process. Firms have to use options as a part of the CEOs compensation package and those options have to be exercisable to enable us to construct the managerial overconfidence measure. In fact, not all UK firms grant CEOs options. These obstacles are inherent in most of the recent studies on managerial overconfidence using UK data. For example, Andriosopoulos et al. (2013) studied the effect of managerial overconfidence and information disclosure on buyback completion rates in the UK with 400 observations. Croci et al. (2010) used 848 observations to examine the impact of overconfident CEOs on bidders' performance in the UK market. Secondly, the design of the panel in this study could produce market survival bias. To be in the sample, two years consecutive data is required for each firm; this yields an unbalanced panel. This could have an impact on the estimated regression coefficients and standard errors. Thirdly, the fixed effects estimation method could not be used as an additional robustness check in this study due to the time-invariance of the overconfidence measure. Nevertheless, this study employs the Tobit model on pooled data with clustering at the firm level and controls for industry and year fixed-effects as a robustness check. Moreover, this work does not consider directly other econometric issues such as endogeneity and selection bias.

6.2 Future research

Several avenues for future research based on the findings and limitations of the thesis are highlighted in this section. Firstly, the empirical study on the information content of dividends could be extended and could consider other forms of dividends such as stock and special dividends. Firms in Oman might use these types of dividends to signal their future prospects instead of regular cash dividends.

Furthermore, the existing research on dividend policy in emerging markets, particularly, in Oman has been conducted based on the traditional corporate finance assumptions where agents are rational, self-interested and utility maximising. As an extension, scholars could examine the impact of investors' irrationality on corporate dividend policy (Baker and Wurgler, 2004). Furthermore, the recent literature on behavioural corporate finance has not been tested in markets where institutional environments are significantly different from those in developed markets. However, this would be difficult to accomplish empirically, as options granted to

CEOs are not used by Omani firms, and earnings forecasts are not available in this market.⁵⁸ Nevertheless, a survey could be conducted to measure managerial miscalibration (Ben-David et al., 2007) or managerial attitude (Graham et al., 2013) and relate it to corporate dividend policy.⁵⁹

The theoretical models developed in this thesis are based on the relationship between overconfidence and dividend policy. It is worth extending these models to alternative payment mechanisms such as share repurchases. Furthermore, the combination of managerial and investor irrationality and their effects on corporate payout policy has not been considered thus far in the existing research. This can be achieved by combining managerial overconfidence with the catering theory of dividends or with market timing due to investors' irrationality.

The results of the final empirical chapter, which examines the effect of overconfident CEOs on dividend policy, do not consider the market reaction to the announcement of dividend changes in firms managed by overconfident CEOs. To the best of my knowledge, only two studies have been conducted examining the stock price response to dividend increases by overconfident managers using US data (Bouwman, 2009; Deshmukh et al., 2013) and their results reveal that there is a higher abnormal stock return after announcing dividend increases by overconfident managers compared to their rational counterparts. However, these studies test short-run market reactions to the announcement of dividend increases and do not consider decreases and no change in dividends. Further, in the UK, dividend and earnings news are announced simultaneously.⁶⁰ Thus, future research analysing the market reaction to the joint signals conveyed by overconfident and rational managers could make a contribution to the signalling literature.

6.3 The Implications of the Thesis

Extensive research has been developed in the finance literature that aims to explain the variation in dividend policy across firms. One particular theory with extended theoretical underpinnings in standard corporate finance is the signalling theory of dividends. This theory suggests that firms use dividend changes to convey information about their future prospects (e.g., Bhattacharya, 1979; Miller and Rock, 1985). Scholars examine this theory by empirically

⁵⁸ These two variables are essential to proxy managerial overconfidence.

⁵⁹ Graham et al. (2013) give us permission to use their survey in Oman.

⁶⁰ Earlier studies examine the short and long run market reaction to the joint announcement of dividend changes and earnings using UK data. For more details see Gunasekarage, and Power (2002, 2006) Abeyratna and Lonie (1996).

investigating the impact of the announcement of dividend changes on stock prices, and the relationship between dividend changes and future earnings.

The majority of earlier studies affirm the effect of dividend change announcements on stock prices (e.g., Nissim and Ziv, 2001; Dasilas and Leventis, 2011). The correlation between dividend changes and future earnings changes are also found to be significantly related (e.g., Harada and Nguyen, 2005; Stacescu, 2006) and more likely to occur in a poor informational environment (Aggarwal et al., 2012). However, evidence from several studies, including Benartzi et al. (1997), Grullon et al. (2005) and this thesis, reveal that dividend changes are not informative about future earnings changes. This thesis uses the empirical findings in Chapter 3 to demonstrate that investors should not view dividend changes as a signal of future earnings changes and trade accordingly. Rather, the change in dividends reflects current earnings changes.

Emerging research in Behavioural corporate finance examines the impact of managerial cognitive biases, e.g. overconfidence, on corporate financial decisions. Although several studies analyse the effect of managerial overconfidence on financing and investment decisions, corporate dividend policy has received little attention in the recent literature. Wu and Liu (2008) theoretically show that overconfident managers are more likely to pay more dividends, while Deshmukh et al. (2013) detect the opposite pattern.

The findings in Chapter 4 demonstrate that the relationship between dividends and overconfidence could be positively or negatively correlated, depending on whether managers are overconfident about current or future performance. Furthermore, this relationship might be affected by managers' and investors' bounded rationality. Therefore, firms with growth opportunities should recruit CEOs who are overconfident about future performance in order to re-invest companies' cash flow in future projects instead of paying dividends. On the other hand, the board of directors in a mature firm should appoint a manager who is overconfident about his current ability, to prevent the CEO from investing the firm's resources in negative NPV projects.

Moreover, investors could gain a further insight into allocating their investments. For example, investors who prefer to invest in stocks that pay high dividends should consider investing in a company run by a manager who is overconfident about his current ability. Furthermore, researchers should benefit from these results in understanding dividend variations among firms, even in the same industry. That is, managerial overconfidence may provide an additional

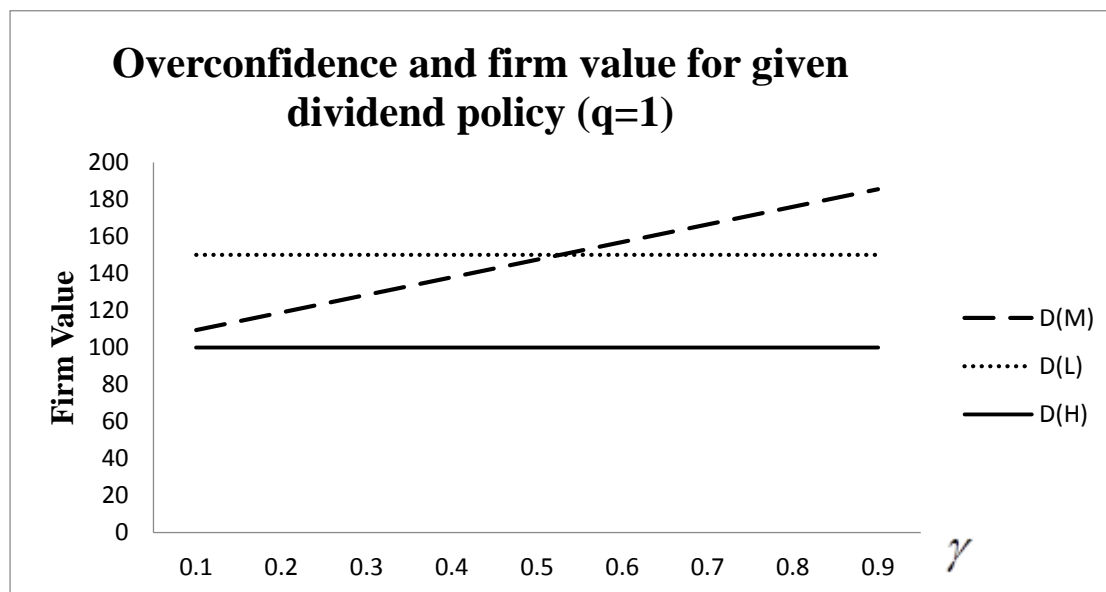
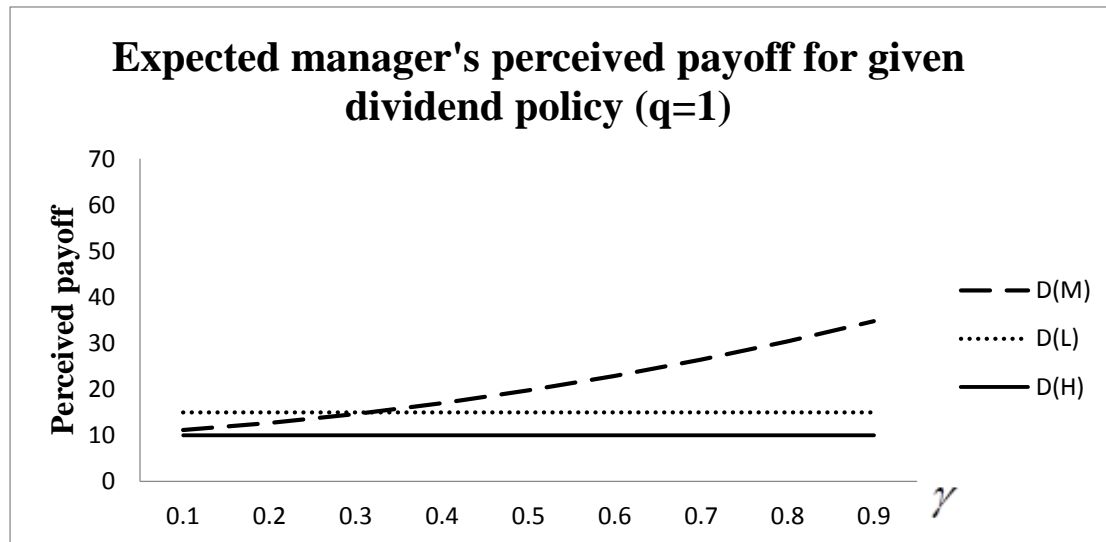
explanation for these differences. The bounded rationality of managers and investors could also provide another explanation for these differences.

The empirical findings in Chapter 5 examining the relationship between managerial overconfidence and corporate dividend policy in the UK reveal that overconfident CEOs pay less dividends than their rational counterparts which is in line with the earlier studies in the US (e.g., Deshmukh et al, 2013). Thus, this finding shows that the impact of overconfident CEOs on dividend policy continues to hold outside the US. Also, undervalued firms run by overconfident managers pay more dividends than those managed by rational managers. Hence, international investors should interpret the change in corporate dividend policy not only to well-known factors, such as a firms' characteristics and corporate governance factors but also to managerial cognitive biases, i.e. overconfidence. Scholars could also benefit from our findings in order to understand the relative disappearance of dividends in recent years (Fama and French, 2001). Moreover, boards of directors should consider the overconfident bias of managers when they supervise and recruit CEOs.

Appendices

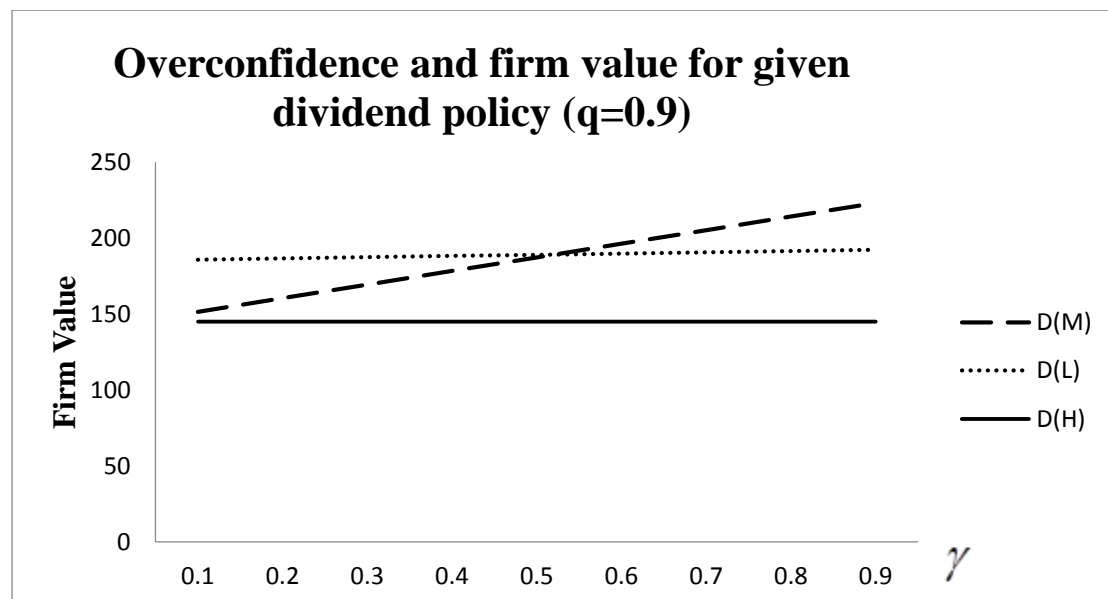
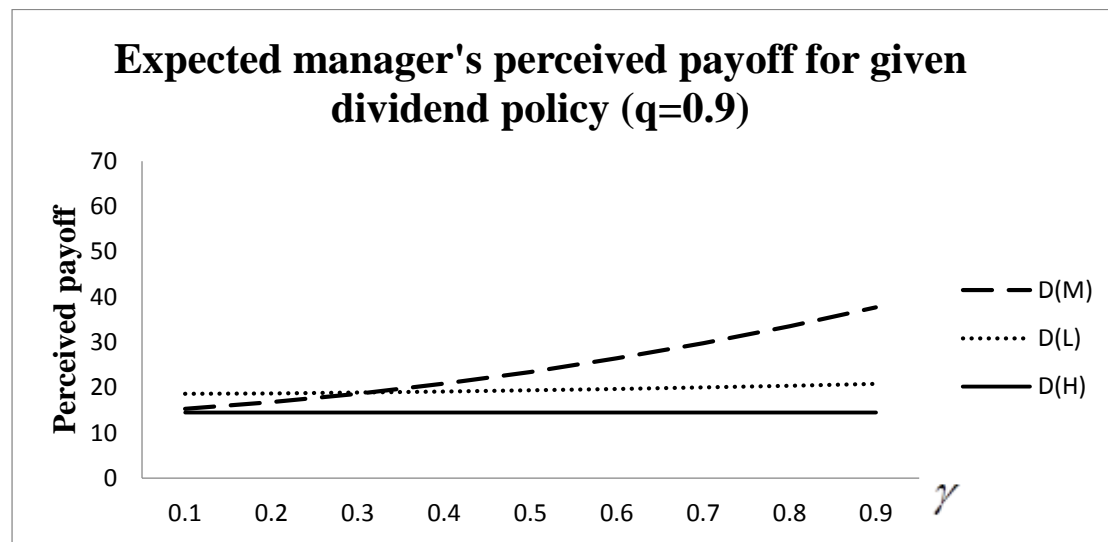
Appendix A: Numerical example of panel A, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	11	110	15	150	10	100
0.2	13	119	15	150	10	100
0.3	15	129	15	150	10	100
0.4	17	138	15	150	10	100
0.5	20	148	15	150	10	100
0.6	23	157	15	150	10	100
0.7	26	167	15	150	10	100
0.8	30	176	15	150	10	100
0.9	35	186	15	150	10	100



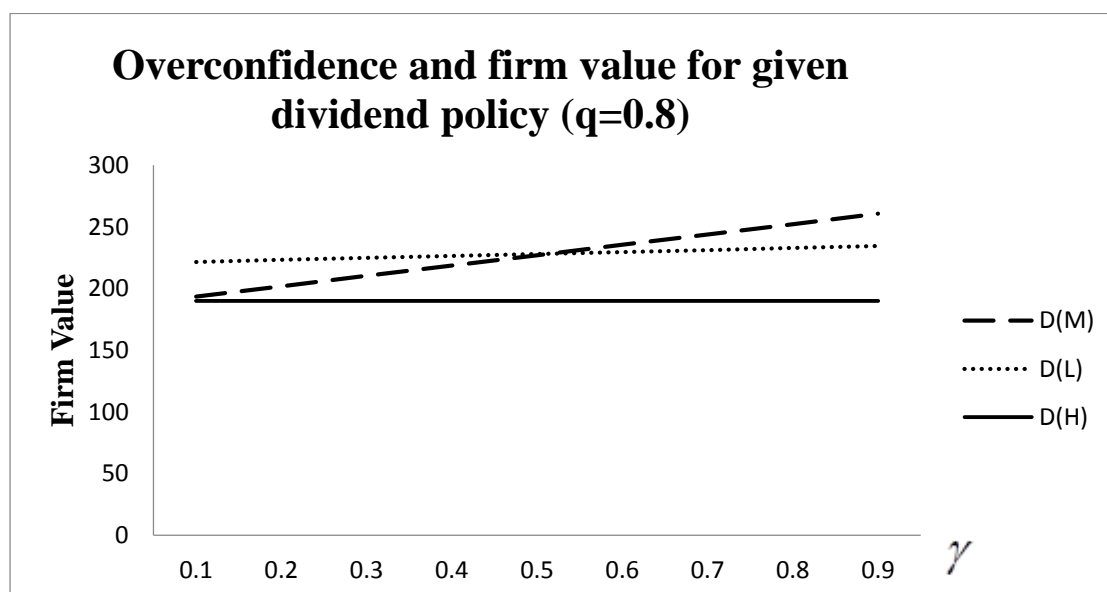
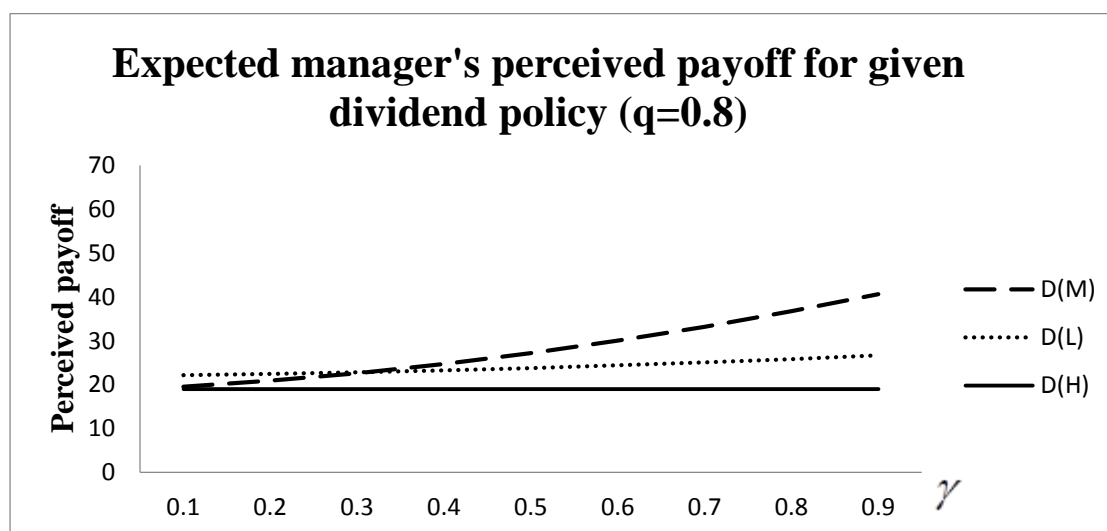
Appendix B: Numerical example of panel B, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	15	151	19	186	15	145
0.2	17	160	19	187	15	145
0.3	19	169	19	187	15	145
0.4	21	178	19	188	15	145
0.5	23	187	19	189	15	145
0.6	26	196	20	190	15	145
0.7	30	205	20	191	15	145
0.8	34	214	20	191	15	145
0.9	38	223	21	192	15	145



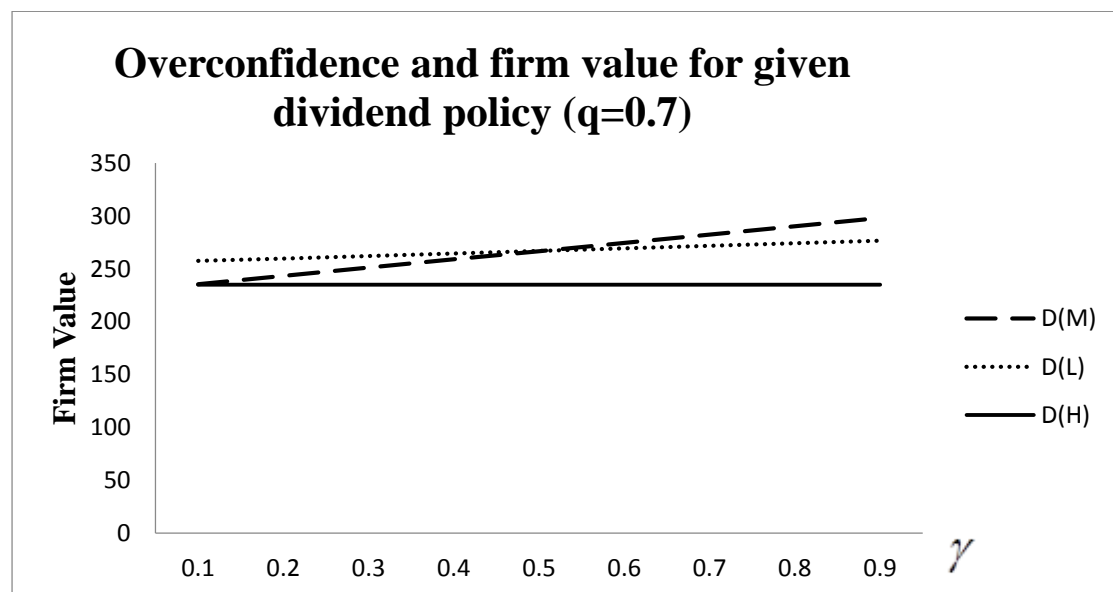
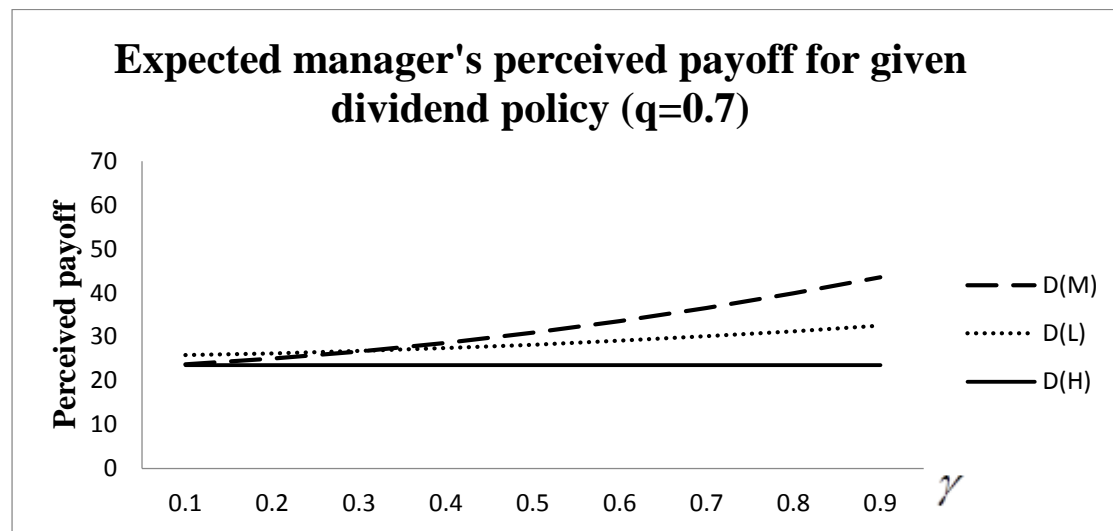
Appendix C: Numerical example of panel C, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	20	193	22	222	19	190
0.2	21	202	22	223	19	190
0.3	23	210	23	225	19	190
0.4	25	219	23	226	19	190
0.5	27	227	24	228	19	190
0.6	30	235	24	230	19	190
0.7	33	244	25	231	19	190
0.8	37	252	26	233	19	190
0.9	41	261	27	234	19	190



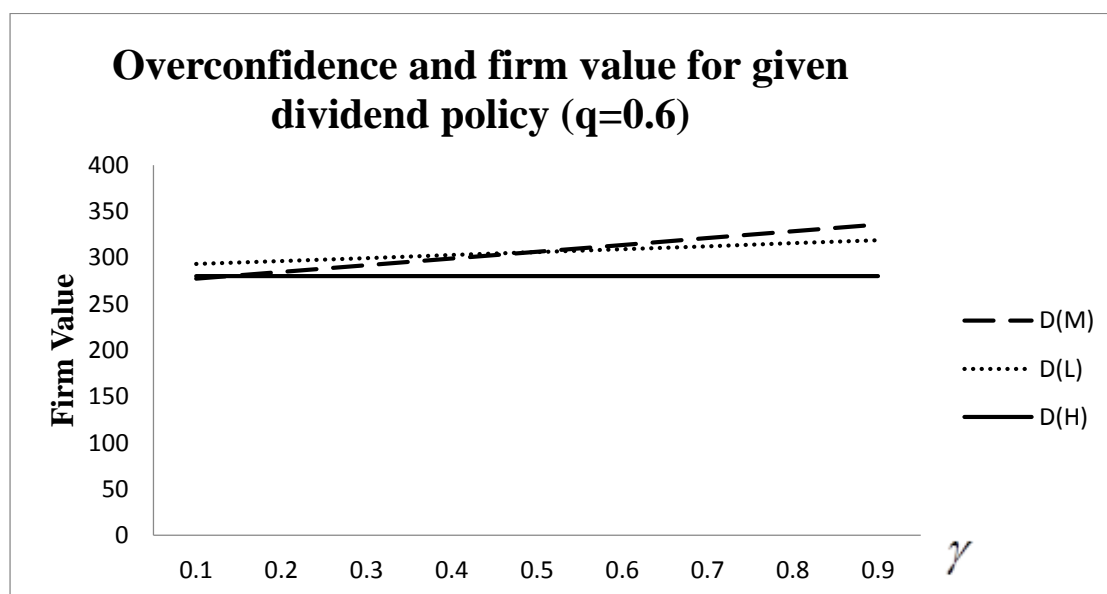
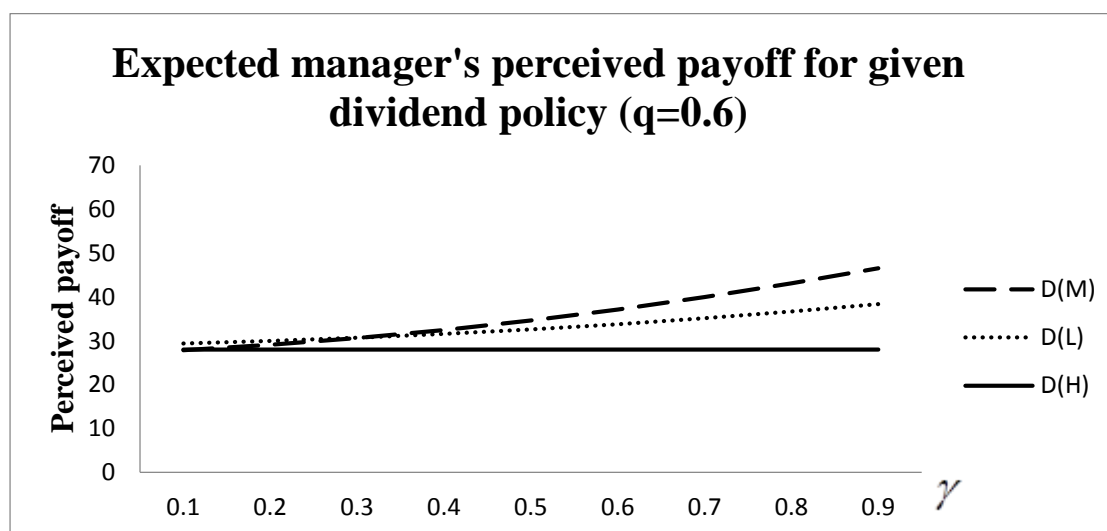
Appendix D: Numerical example of panel D, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	24	235	26	257	24	235
0.2	25	243	26	260	24	235
0.3	<u>27</u>	251	<u>27</u>	262	24	235
0.4	29	259	27	265	24	235
0.5	31	<u>267</u>	28	<u>267</u>	24	235
0.6	34	275	29	269	24	235
0.7	37	282	30	272	24	235
0.8	40	290	31	274	24	235
0.9	44	298	33	277	24	235



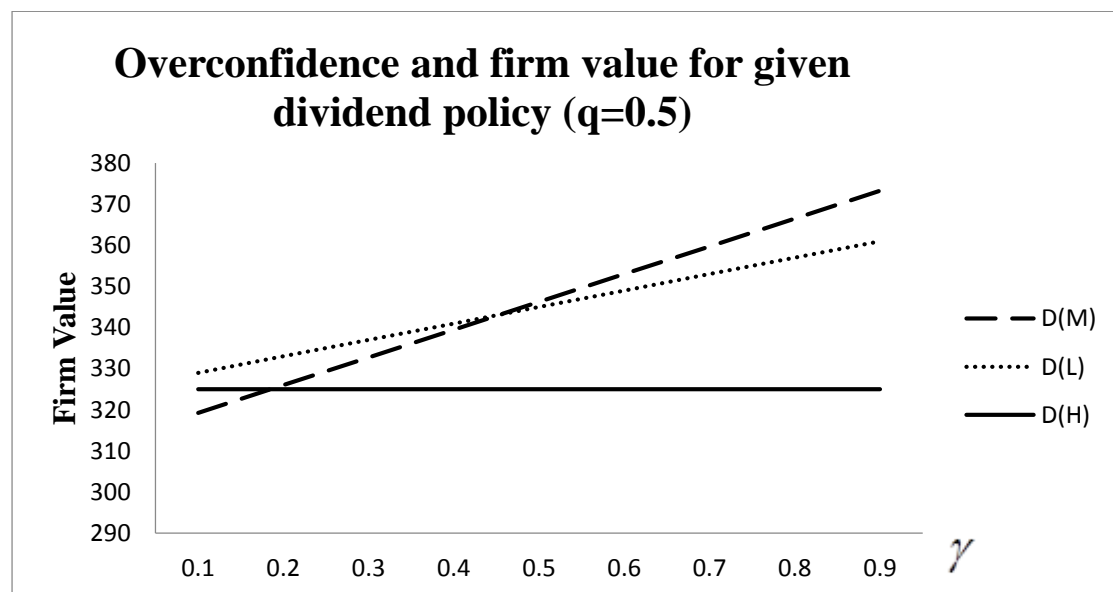
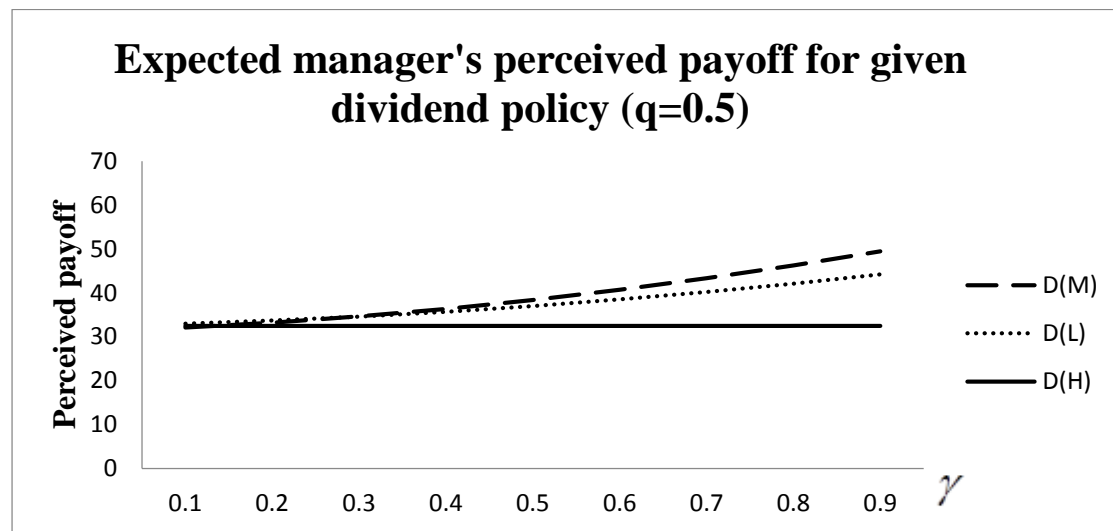
Appendix E: Numerical example of panel E, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	28	277	29	293	28	280
0.2	29	285	30	296	28	280
0.3	<u>31</u>	292	<u>31</u>	300	28	280
0.4	<u>32</u>	299	<u>32</u>	303	28	280
0.5	35	307	33	306	28	280
0.6	37	314	34	309	28	280
0.7	40	321	35	312	28	280
0.8	43	328	37	316	28	280
0.9	47	336	38	319	28	280



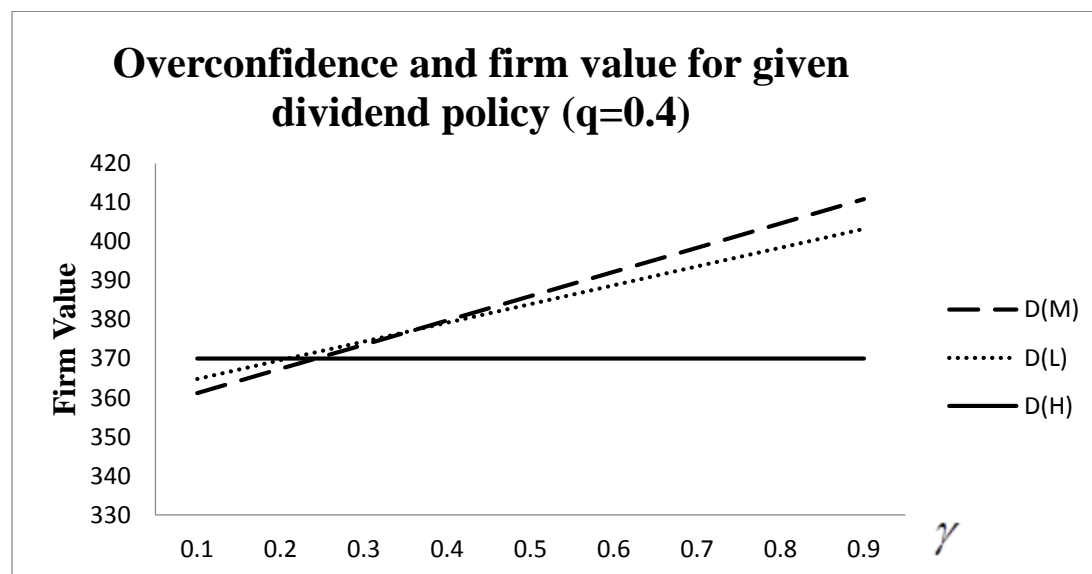
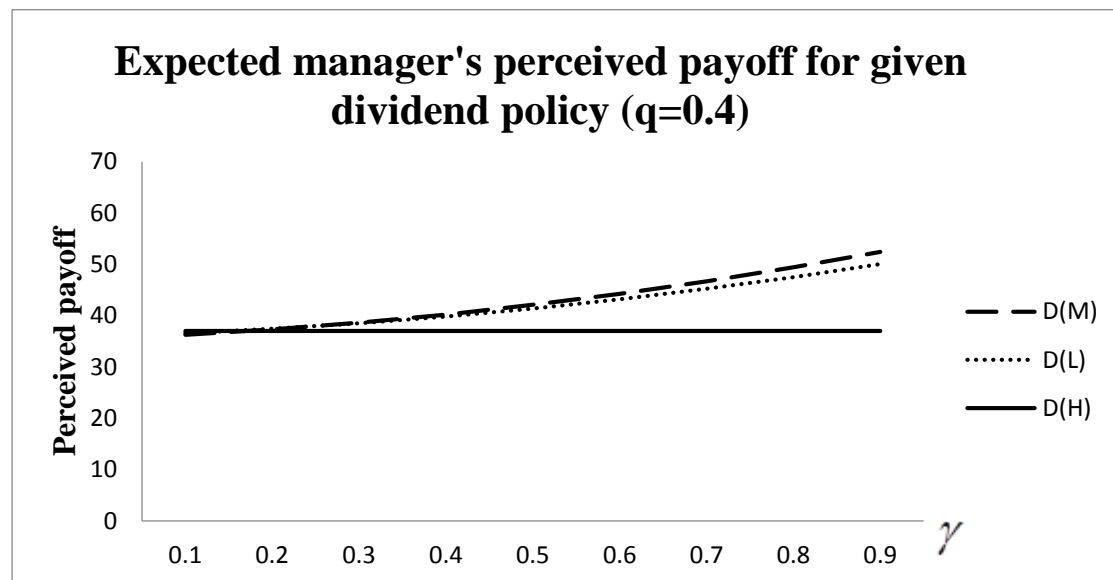
Appendix F: Numerical example of panel F, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	32	319	<u>33</u>	329	<u>33</u>	325
0.2	33	326	34	333	33	325
0.3	<u>35</u>	333	<u>35</u>	337	33	325
0.4	<u>36</u>	340	<u>36</u>	341	33	325
0.5	38	346	37	345	33	325
0.6	41	353	39	349	33	325
0.7	43	360	40	353	33	325
0.8	46	367	42	357	33	325
0.9	49	373	44	361	33	325



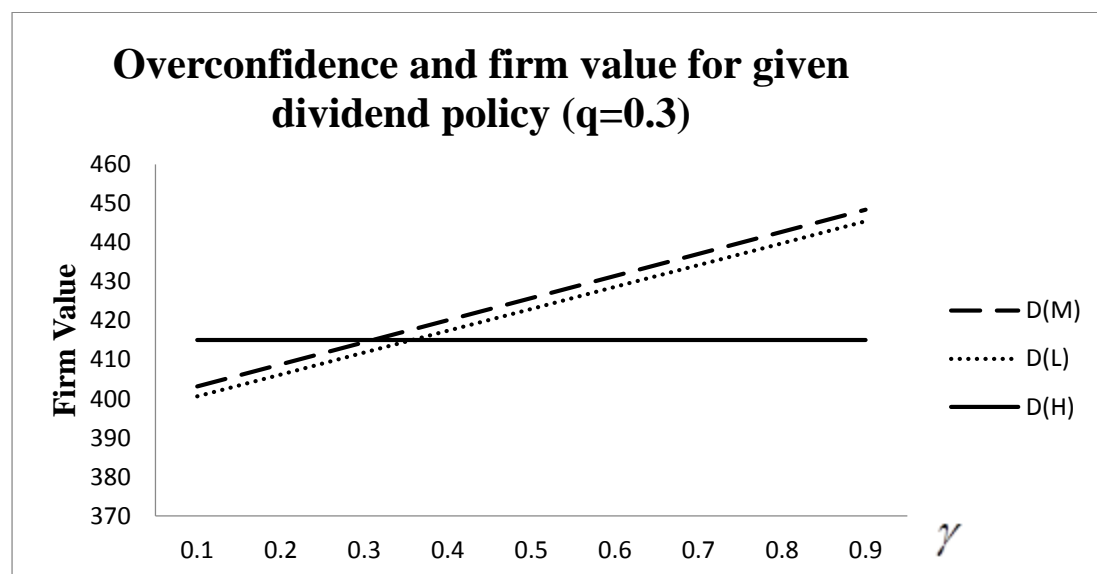
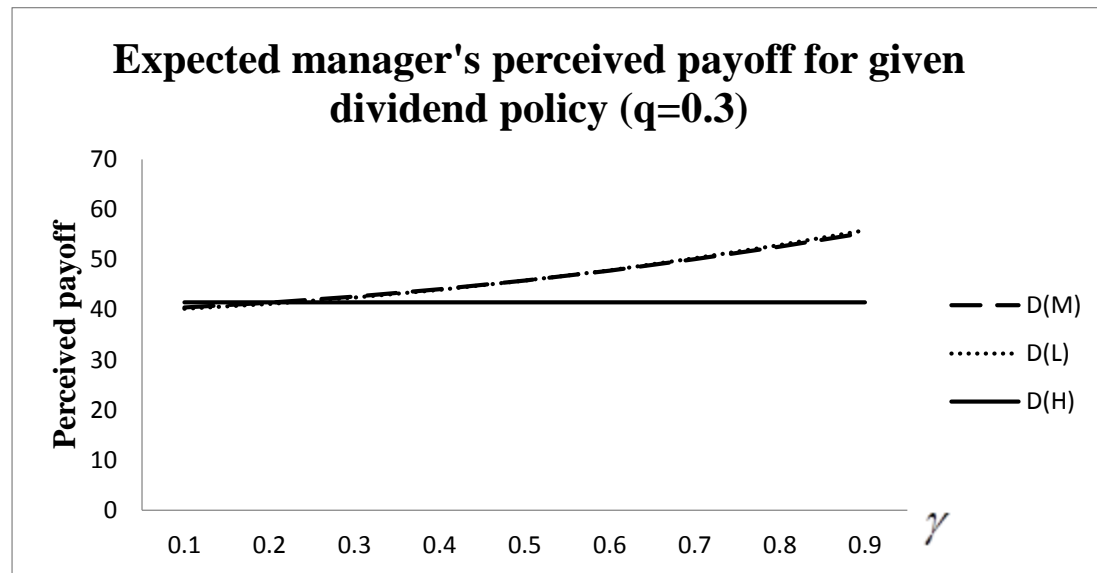
Appendix G: Numerical example of panel G, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	36	361	36.6	364.8	37	370
0.2	37	367	37.4	369.6	37	370
0.3	39	374	38.5	374.4	37	370
0.4	40	380	39.8	379.2	37	370
0.5	42	386	41.4	384	37	370
0.6	44	392	43.2	388.8	37	370
0.7	47	398	45.2	393.6	37	370
0.8	49	405	47.5	398.4	37	370
0.9	52	411	50.0	403.2	37	370



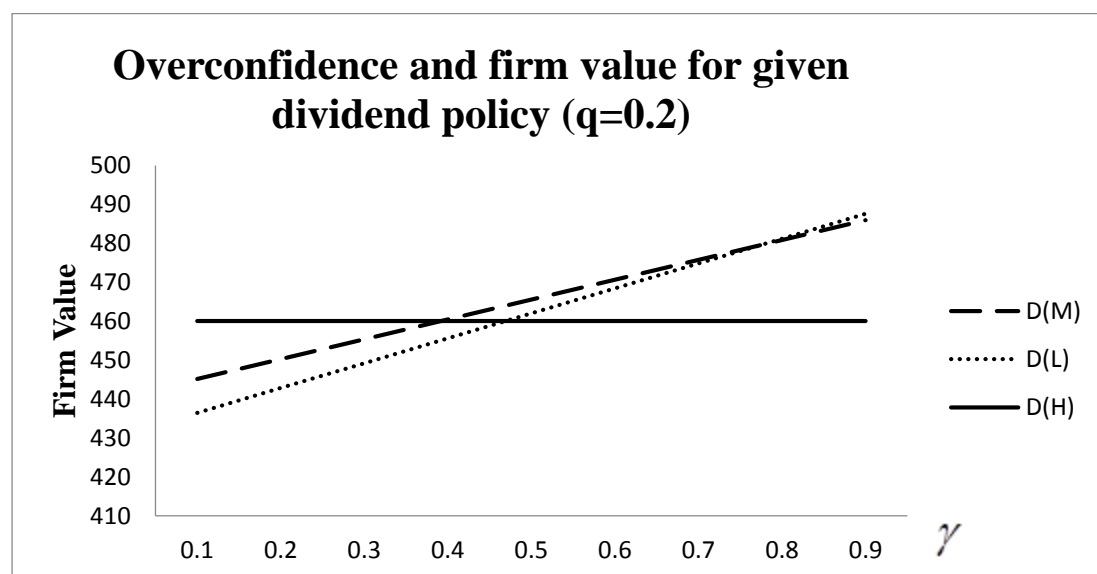
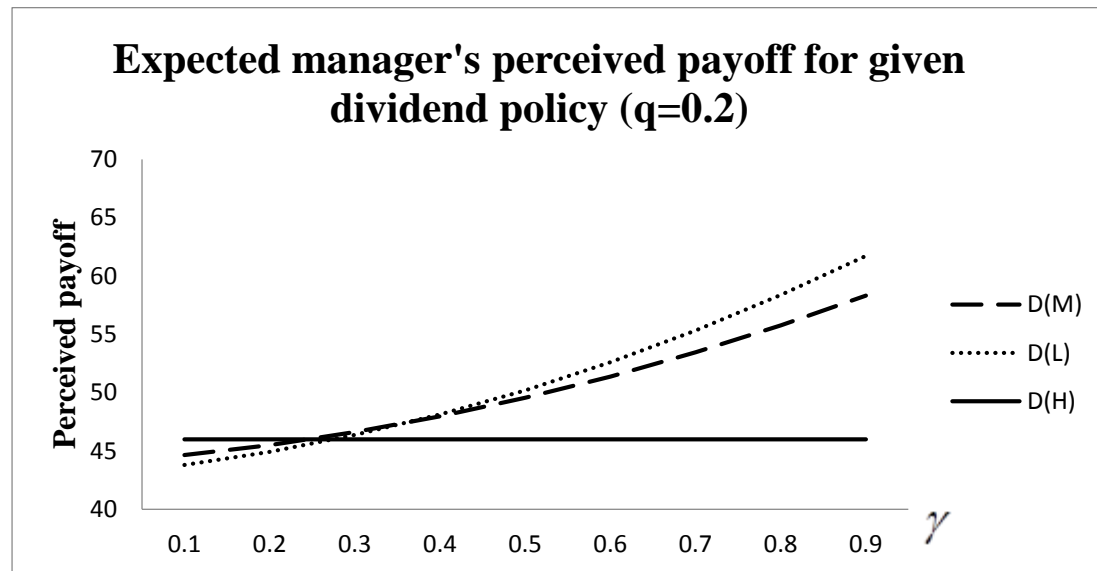
Appendix H: Numerical example of panel H, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	40	403	40	401	42	415
0.2	41	409	41	406	42	415
0.3	43	414	42	412	42	415
0.4	44	420	44	417	42	415
0.5	46	426	46	423	42	415
0.6	48	431	48	429	42	415
0.7	50	437	50	434	42	415
0.8	53	443	53	440	42	415
0.9	55	448	56	445	42	415



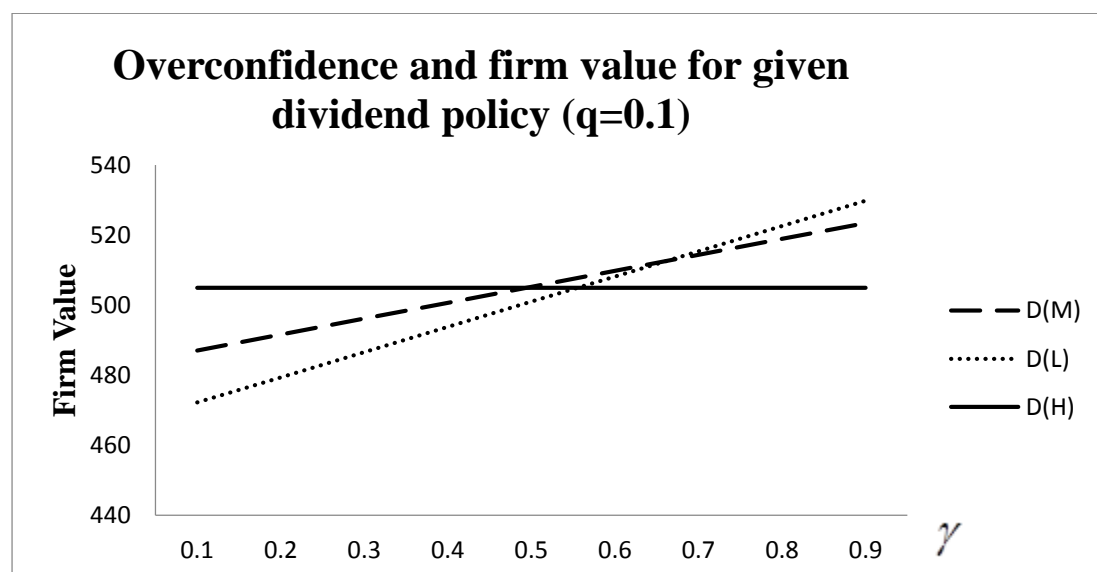
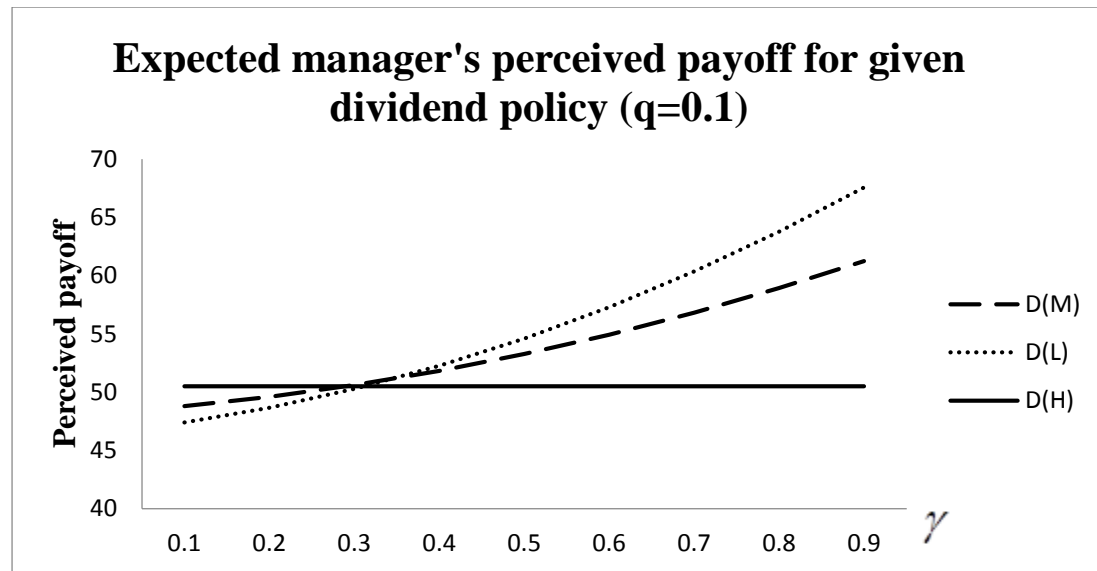
Appendix I: Numerical example of panel I, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	45	445	44	436	46	460
0.2	46	450	45	443	46	460
0.3	47	455	46	449	46	460
0.4	48	460	48	456	46	460
0.5	50	466	50	462	46	460
0.6	51	471	53	468	46	460
0.7	53	476	55	475	46	460
0.8	56	481	58	481	46	460
0.9	58	486	62	488	46	460



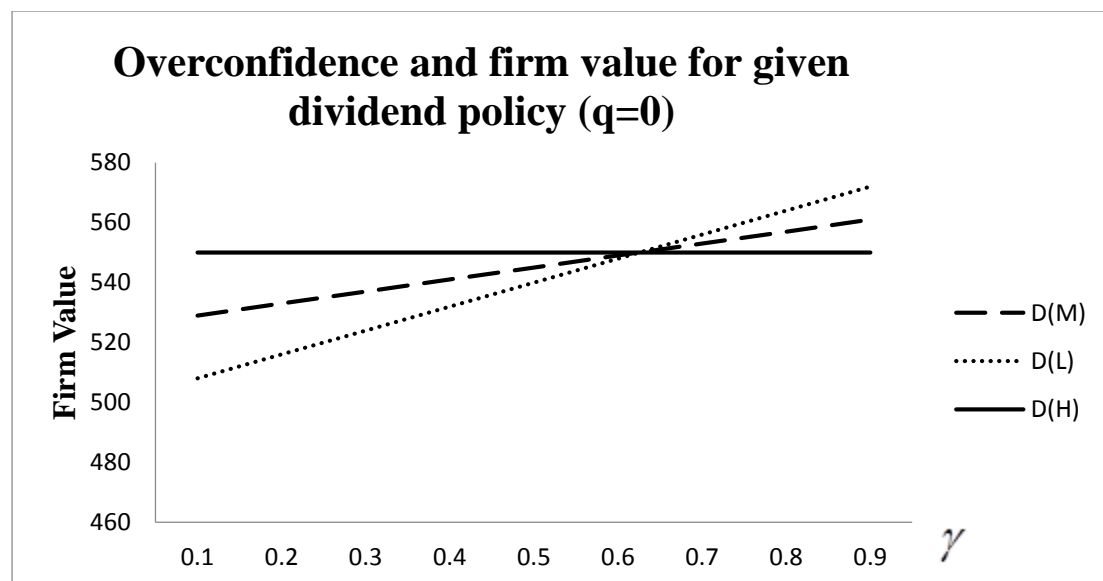
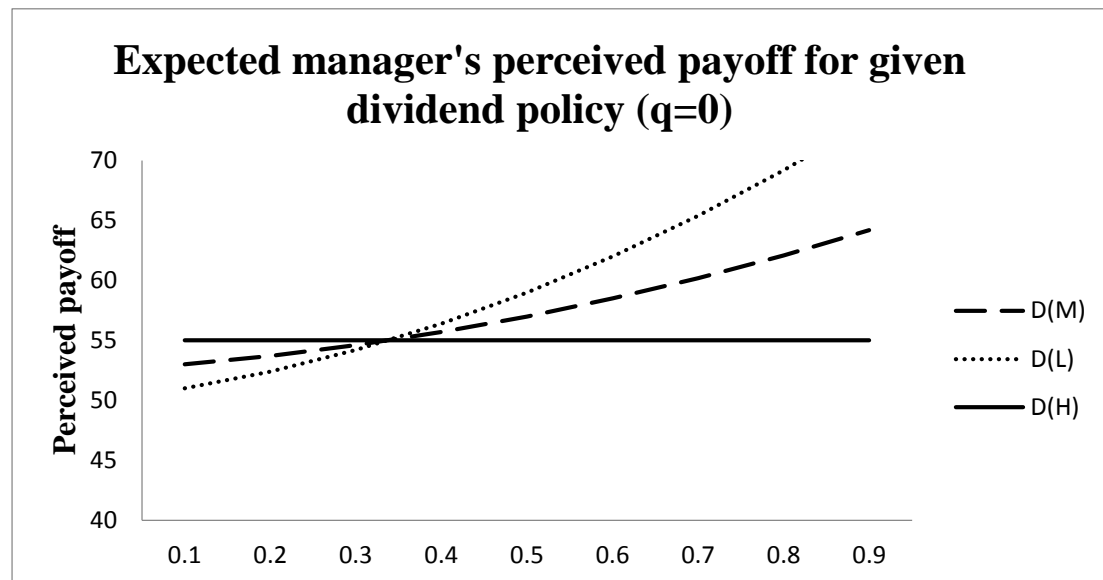
Appendix J: Numerical example of panel J, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	49	487	47	472	51	505
0.2	50	492	49	479	51	505
0.3	51	496	50	487	51	505
0.4	52	501	52	494	51	505
0.5	53	505	55	501	51	505
0.6	55	510	57	508	51	505
0.7	57	514	60	515	51	505
0.8	59	519	64	523	51	505
0.9	61	523	68	530	51	505



Appendix K: Numerical example of panel K, Table 4.8

$\hat{\gamma}_q$	Medium Dividend		Low Dividend		High Dividend	
	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value	Managerial perceived payoff	Firm value
0.1	53	529	51	508	55	550
0.2	54	533	52	516	55	550
0.3	55	537	54	524	55	550
0.4	56	541	56	532	55	550
0.5	57	545	59	540	55	550
0.6	59	549	62	548	55	550
0.7	60	553	65	556	55	550
0.8	62	557	69	564	55	550
0.9	64	561	73	572	55	550



Appendix L: Marginal effects at the means (MEMs)

Table A.5.4. Overconfidence and dividend levels : Marginal effects at the means (MEMs)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Overconfidence	--	-0.007*	-0.008**	-0.006*	-0.007**	-0.006*	-0.006*	-0.007**	-0.009***	-0.009***	
Pre-Holder											-0.009***
Post-Holder											-0.009**
Cash Flow		0.094***	0.087***								
Leverage		-0.005**			-0.005**						
Size (Assets)		0.003***	0.003***	0.002**	0.003**				0.002**	0.003**	0.003**
Current Growth		-0.004**	-0.004**	-0.004**	-0.004**				-0.004**	-0.004**	-0.004**
Tangibility		-0.008	-0.008	0.000	-0.004				-0.004	-0.005	-0.005
Stock Return		-0.001	-0.002	-0.002	-0.001				-0.002	-0.002	-0.002
Dividend Premium		-0.0003	-0.0001	-0.001	-0.001				-0.001	-0.0004	-0.0005
Undervaluation			-0.003***	-0.004***					-0.003***	-0.003***	-0.003***
Investment				-0.036**							
ROA					0.098***				0.093***	0.094***	0.094***
Board Size						0.001*	0.001**		0.001*	0.001**	0.001**
Board Composition						0.004	0.004		0.003	0.004	0.004
Institutional 3%						0.008			0.015***		
Concentration 3%							0.0001			0.0001***	0.0001***
Option Ownership								-0.201	-0.172	-0.178	-0.172
Stock Ownership								-0.033	-0.008	-0.014	-0.014
Duality								0.0001	-0.001	-0.001	-0.001
Age								0.001***	0.0004**	0.0004**	0.0004*
CEO Tenure								0.0000	-0.0001	-0.0001	-0.0001
CEO in Role								-0.001***	-0.0005**	-0.0005**	-0.0005**
Founder								0.006	0.003	0.003	0.003
British								0.004	0.005	0.005*	0.005*

Notes: This table reports the marginal effects at the means from Table 5.4. The dependent variable is *Dividends/Assets*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. *z* values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table A.5.5: Overconfidence and the Propensity to Pay Dividend: Marginal effects at the means (MEMs).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Dependent variable=Dividend (Dummy)</i>						
Overconfident CEO	-0.0068*	-0.0078*	-0.0086*	-0.0053*	-0.0377**	-0.0385**
Cash Flow	0.0855***		0.0896***			
Leverage	-0.0111**			-0.0086**		
Size (Ln TA)	0.0176**	0.0200**	0.0226**	0.0145**	0.0372**	0.0382**
Growth (in assets)	-0.0024	-0.0010	-0.0046	-0.0034	-0.0085	-0.0088
Tangible Assets	0.0174*	0.0224**	0.0264***	0.0186***	0.0777***	0.0782**
Stock Return	0.0015	-0.0008	0.0002	0.0010	0.0049	0.0050
Dividend Premium	-0.0033	-0.0056	-0.0058	-0.0037	-0.0198	-0.0202
Profit		0.0799***				
Undervaluation		-0.0054***	-0.0047***		-0.0083**	-0.0084**
ROA				0.0729***	0.2182***	0.2239***
Board Size					0.0013	0.0014
Board Compositions					-0.0657	-0.0701
Institutional Ownership 3%					0.0315	
Concentration 3%						0.0003
CEO Vested Option					0.1668	0.1910
CEO Stock Ownership					0.0901	0.0631
Duality					-0.0100	-0.0109
CEO Age					0.0028**	0.0029**
CEO Tenure					0.0036**	0.0037**
CEO in Role					-0.0015	-0.0015
Founder					-0.0440*	-0.0452
British					0.0670**	0.0717**

Notes: This table reports the marginal effects from Table 5.5. The dependent variable is *Dividends (Dummy)*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. *z* values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively

Table A.5.6. Overconfidence and dividend levels: the interaction effects (Marginal effects at the means (MEMs))

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Overconfidence	-0.0016	-0.0030	-0.0089***	-0.0134***	-0.0082	-0.0132***	-0.0133***
Cash Flow	0.1182***						
Overconfidence * Cash Flow	-0.0504***						
ROA		0.1241***	0.0942***	0.0959***	0.0937***	0.0948***	0.0945***
Overconfidence * ROA		-0.0793***					
Current Growth	-0.0026	-0.0039**	-0.0038*	-0.0039**	-0.0043**	-0.0047**	-0.0047**
Overconfidence * Current Growth			-0.0015				
Undervaluation		-0.0034***	-0.0033***	-0.0045***	-0.0033***	-0.0033***	-0.0033***
Overconfidence * Undervaluation				0.0034***			
Leverage	-0.0048**						
Size (Assets)	0.0031**	0.0027**	0.0025**	0.0024**	0.0025**	0.0027**	0.0026**
Tangibility	-0.0088	-0.0068	-0.0050	-0.0044	-0.0051	-0.0058	-0.0049
Stock Return	-0.0032	-0.0117	-0.0141	-0.0147	-0.0139	-0.0123	-0.0071
Dividend Premium	-0.0005	-0.0008	-0.0005	-0.0005	-0.0005	-0.0008	-0.0008
Board Size	0.0009*	0.0007	0.0009**	0.0009*	0.0010*	0.0009*	0.0008*
Overconfidence * Board Size					-0.0001		
Board Composition	0.0046	0.0047	0.0037	0.0061	0.0036	0.0043	0.0039
Concentration 3%	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***	0.0001*	
Overconfidence * Concentration 3%						0.0002**	
Institutional 3%							0.0094
Overconfidence * Institutional 3%							0.0190**
Option Ownership	-0.2063	-0.1913	-0.1718	-0.1711	-0.1793	-0.1862	-0.1691
Stock Ownership	-0.0032	-0.0117	-0.0141	-0.0147	-0.0139	-0.0123	-0.0071
Duality	-0.0014	-0.0020	-0.0015	-0.0020	-0.0014	-0.0014	-0.0015
Age	0.0004*	0.0004**	0.0004*	0.0004*	0.0004**	0.0004*	0.0004*
CEO Tenure	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
CEO in Role	-0.0005	-0.0005	-0.0005	-0.0005	-0.0005	-0.0005	-0.0005
Founder	0.0019	0.0018	0.0027	0.0025	0.0027	0.0024	0.0030
British	0.0065**	0.0061*	0.0055*	0.0062*	0.0056*	0.0057*	0.0056*

Notes: This table reports the marginal effects from Table 5.6. The dependent variable is *Dividends/Assets*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. *z* values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table A.5.7 : Robustness Checks: Overconfidence and Alternatives Measures of Dividend Payout (Marginal effects at the means (MEMs))

	Model 1	Model 3	Model 5	Model 7
Dependent variable	Dividends/MV	Dividends/Sale	Dividends/EBITDA	Dividends/Earnings
Overconfident CEO	-0.0118***	-0.0126***	-0.0479**	-0.0813**
ROA	0.0653***	0.0800***	0.3555***	0.4564***
Undervaluation	0.0005	-0.0038***	-0.0205***	-0.0181**
Size (Ln TA)	0.0049***	0.0105***	0.0255***	0.0426***
Growth (in assets)	-0.0067***	-0.0059**	-0.0347***	-0.0303
Tangible Assets	-0.0024	-0.0243***	-0.0931***	-0.0086
Stock Return	-0.0061***	-0.0011	-0.0235**	-0.0287**
Dividend Premium	-0.0025	-0.0028	0.0042	-0.0185
Board Size	-0.0001	0.0002	0.0025	0.0132***
Board Compositions	-0.0107	0.0013	0.0115	-0.0129
Concentration 3%	0.0001**	0.0002***	0.0011***	0.0019***
CEO Vested Option	-0.1976	-0.0095	-2.0556**	-0.9323
CEO Stock Ownership	-0.0190	-0.0085	-0.0563	-0.2321
Duality	0.0026	0.0031	-0.0097	-0.0344
CEO Age	0.0004*	0.0004	0.0024*	0.0042**
CEO time in firm	-0.0001	-0.0002	0.0002	0.0010
CEO time in Role	-0.0003	-0.0004	-0.0046***	-0.0066***
Founder	-0.0046	-0.0017	0.0374	-0.0234
CEO Nationality	0.0042	0.0064	0.0469**	0.0558

Notes: This table reports the marginal effects from Table 5.7 (models 1, 2 and 3). The dependent variable is one of the proxies shown as above. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. *z* values are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively

Table A.5.8. Overconfidence and dividend levels: pooled Tobit estimates (Marginal effects at the means (MEMs))

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Overconfidence	-0.0103**	-0.0088***	-0.0082**	-0.0090***	-0.0095**	-0.0105***	-0.0095**	-0.0104**	-0.0085*	-0.0092***	
Pre-Holder											-0.0100***
Post-Holder											-0.0085**
Cash Flow		0.2025***		0.1888***							
Leverage		0.0004				-0.0034					
Size (Assets)		0.0007	0.0003	0.0006	-0.0014	0.0002				-0.0009	-0.0009
Current Growth		-0.0077***	-0.0075***	-0.0083***	-0.0091***	-0.0101***				-0.0102***	-0.0102***
Tangibility		-0.0122*	-0.0102*	-0.0108*	0.0058	-0.0028				-0.0040	-0.0042
Stock Return		-0.0062***	-0.0061***	-0.0073***	-0.0084***	-0.0076***				-0.0074***	-0.0074***
Dividend Premium		0.0023	0.0032*	0.0027	0.0015	0.0014				0.0016	0.0013
Profitability			0.2067***								
Undervaluation			-0.0029**	-0.0021	-0.0114***					-0.0030**	-0.0030**
Investment					-0.0882**						
ROA						0.2516***				0.2280***	0.2275***
Board Size							0.0012	0.0008**		0.0013**	0.0013**
Board Composition							0.0149	0.0079		0.0040	0.0043
Institutional 3%							0.0003				
Concentration 3%								-0.0045**		-0.0003**	-0.0002**
Option Ownership									-0.9335***	-0.7586**	-0.7516**
Stock Ownership									0.0829**	0.0215	0.0214
Duality									-0.0020	-0.0049	-0.0048
Age									-0.0002	0.0000	0.0000
CEO Tenure									0.0000	-0.0002	-0.0002
CEO in Role									-0.0002	-0.0003	-0.0003
Founder									-0.0008	0.0010	0.0011
British									0.0016	0.0061	0.0060

Notes: This table reports the marginal effects from Table 5.8. The dependent variable is *Dividends/Assets*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. The *t*-statistics are based on standard errors clustered at firm level, which are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table A. 5.9. Overconfident and Share repurchases (Marginal effects at the means (MEMs))

	Model 7	Model 8
Dependent variable: Rep (Dummy)		
Overconfident CEO	0.119*	0.120*
ROA	0.945***	0.961***
Undervaluation	-0.039*	-0.039*
Size (Ln TA)	0.071***	0.074***
Growth (in assets)	-0.143**	-0.142**
Tangible Assets	0.180	0.179
Stock Return	-0.039	-0.039
Dividend Premium	0.037	0.033
Board Size	0.009	0.009
Board Composition	0.089	0.093
Institutional Holdings 3%	0.002	
Concentration 3%		0.001
CEO Vested Option	2.741	2.816
CEO Stock Ownership	0.147	0.122
Duality	-0.030	-0.030
CEO Age	-0.006	-0.006
CEO Tenure	-0.001	-0.001
CEO in Role	0.005	0.005
Founder	-0.057	-0.057
British	0.172**	0.172**

Notes: This table reports the marginal effects from Table 5.9 (models 7 and 8). The dependent variable is *Dividends (Dummy)*. See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. The *t-statistics* are based on standard errors clustered at firm level, which are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively

Table A.5.10. Overconfident and Total payout (Marginal effects at the means (MEMs))

	Model 3	Model 4
Dependent variable	Total payout/MV	
Overconfident CEO	-0.0090**	-0.0088**
ROA	0.1246***	0.1244***
Undervaluation	0.0022	0.0022
Size (Ln TA)	0.0068***	0.0068***
Growth (in assets)	-0.0123***	-0.0122***
Tangible Assets	0.0040	0.0033
Stock Return	-0.0078***	-0.0078***
Dividend Premium	-0.0040	-0.0039
Board Size	-0.0006	-0.0005
Board Composition	-0.0190*	-0.0182*
Institutional Holdings 3%	0.0149	
Concentration 3%		0.0001
CEO Vested Option	-0.4068	-0.4084
CEO Stock Ownership	0.0036	-0.0056
Duality	0.0015	0.0013
CEO Age	0.0001	0.0001
CEO Tenure	-0.0001	-0.0001
CEO in Role	0.0001	0.0001
Founder	-0.0045	-0.0049
British	0.0079*	0.0083**

Notes: This table reports the marginal effects from Table 5.9 (models 7 and 8). The dependent variable is total payout to the market value (total payout/MV). See Table 5.1 for the definition of variables. All explanatory variables are lagged by one year. The variables are winsorized at the 1st and 99th percentiles. The *t-statistics* are based on standard errors clustered at firm level, which are reported in the parentheses. ***, **, * denotes significance at the 1%, 5% and 10% level, respectively

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